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TUBERCULOSIS IN INDUSTRY*

BY

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Tuberculosis is a disease full of uncertainties. Our inability to determine accurately the degree of disablement, the possibility of infection in those who have apparently recovered, and the uncertain prognosis of any case cause endless problems to those studying its relation to industry. To the employer, responsible for the welfare of his staff, who has to measure efficiency in terms of costings and production, infection and reduced working capacity are two features of the disease that cause him to look upon the employment of the tuberculous with anxiety. On the other hand there is a natural desire to assist such disabled persons to obtain suitable work with a living wage: we do not wish to penalize anybody because he has tuberculosis.

Much harm can be caused by exaggerating the infectivity of the disease and the relationship to tuberculosis of the fumes and dusts of certain industries. An occupation itself rarely causes tuberculosis, though it may be a predisposing factor; but before we can come to any conclusion we must refer to the present knowledge of the pathogenesis of tuberculosis.

Pathogenesis of Tuberculosis

The majority of persons over the age of 30 have received and recovered from their primary contact with the tubercle bacillus; but the age when the primary infection is received is rising. This is seen from the recent work on skin-testing certain classes (Table I).

TABLE I.—*Percentage of Negative Skin Reactors*

Authority	Class	No.	Ages	Percentage Negative
Daniels (1944) ..	Nurses	3,764	All	19·2
Lees (1943)	Nurses			20·4
Lees	Students	73,000	School	78·2
Anderson (1943) ..	Nurses		15–19	76·4
			20–24	51·2
			25–29	30·2
			30–34	17·2
Profit Survey (1944) ..	Naval boys		15–16	40·0
	London boys		15–16	12·0
	Nurses (voluntary hospital)		16–30	11·5
	Nurses (municipal hospital)		16–30	17·8
	Medical students		Male	16·3
			Female	11·2

The healed primary complex, consisting of the focus at the site of infection and the lymphatic gland into which it drains, appears to confer a certain degree of immunity but at the same time may harbour virulent organisms which, if resistance is lowered, may cause reactivation of the lesion and, eventually, lesions of the reinfection type in other parts of the lung. Whether an exogenous reinfection causes an endogenous exacerbation or is itself the cause of the lesion does not concern us; but in all those occupations in which there is no reason to suppose that the individual is exposed to recurrent infection the chief cause of the development of a secondary lesion is lowered resistance. Where resistance is maintained at a high level by adequate nourishment, rest, and good environment, as in sanatoria or village settlements, constant contact with highly infectious cases fails to produce active tuberculosis in the large majority of the staff.

* Read at the meeting of the Tuberculosis Association at Oxford on July 18, 1946.

Incidence and Mortality

Not only is primary contact with the bacillus occurring later, but the age group showing the highest incidence of tuberculosis is also rising, particularly in males. In Figs. 1 and 2 the distribution of fatal cases according to age groups is shown for the years 1937–9 and 1940–1 for the county of Middlesex, for males and females (E. Lewis-Faning, 1943). The increase in the higher age groups for males is clearly indicated.

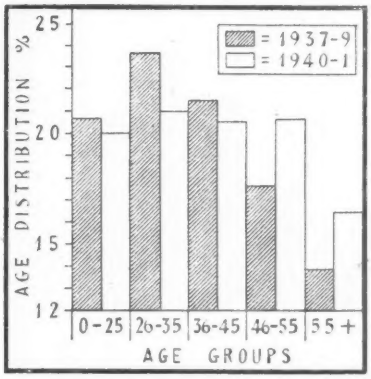

FIG. 1.—Pulmonary tuberculosis. Males. Distribution of fatal cases according to age groups. (*British Medical Journal*, 1943, **2**, 684.)

Furthermore, when we work out (Parliamentary report, 1943) the percentage increase or decrease of the 1942 tuberculosis figures compared with those of 1938 for the various age groups the increase in all ages over 10 becomes apparent (Fig. 3).

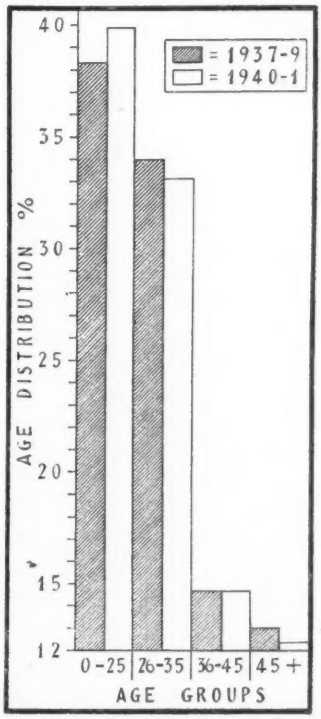

FIG. 2.—Pulmonary tuberculosis. Females. Distribution of fatal cases according to age groups. (*British Medical Journal*, 1943, **2**, 684.)

This means that active tuberculosis is being found more often than before in the more experienced worker. Most of those lesions in the 35–45 age group are probably due to endogenous reinfection resulting from lowered resistance. In women the maximum incidence is earlier and other factors influence the problem. We know very little of the effect that endocrine disturbances have on the development of tuberculosis, and it may be that the unstable state of adolescent girls is related to the rapid rise of the incidence curve between the ages of 15 and 25. But this will not explain the distinct rise in incidence and mortality in the 20–30 age group during the war years 1940–2. The problem we have to solve is how far industry is responsible for the changes in the incidence of tuberculosis in the various age groups.

The rate of discovery of cases has increased, so the rise in incidence is not a true rise in the rate of development of the disease. Some consider

that the increase in case-finding, mainly by radiography, accounts for 50% of the rise. For the remaining 50% we must look elsewhere. Diet, overwork, anxiety, overcrowding, and poor ventilation are probably the chief predisposing causes.

Influence of Industrial Conditions

Although normally only eight hours of the day are spent in work, it is important that working conditions should be satisfactory, and I am not going to expatiate on the necessity for adequate ventilation, good lighting, and sufficient nourishment during working hours. Absence of these will cause a lowered resistance, which may lead to reactivation of an old focus or to a new focus from recurrent infection from a probably unknown carrier. In workers previously uninfected a progressive primary lesion may develop from the initial infection, or the reinfection may follow so quickly upon the primary that a secondary lesion develops before the primary has had time to heal or acquired immunity to develop. Where working conditions are poor there is often an abnormal amount of dust,

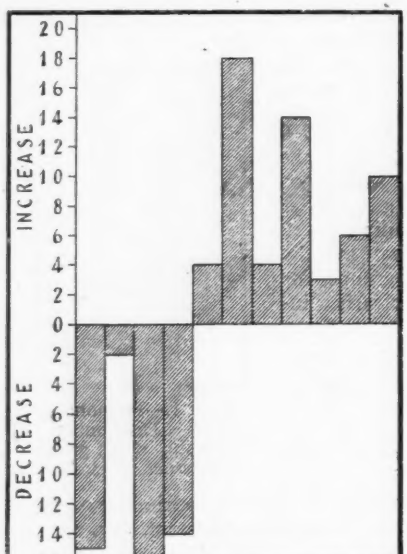

FIG. 3.—Percentage increase or decrease of notifications of tuberculosis in age groups in 1942 compared with 1938.

and although it is difficult to demonstrate tubercle bacilli in dust even when collected from rooms occupied by open infectious cases, the incidence of phthisis is usually higher in dusty occupations than in others. Some dusts bear a special relationship to the development of tuberculosis; these dangerous trades are well known, and skiagraphic examination of all entrants is essential, as well as an annual survey of all employees.

It is not easy to estimate the danger of dust to health. The so-called harmless dusts may indirectly spread tuberculosis by causing chronic catarrh in an individual with an undiscovered active lesion. Some time ago I made an investigation of a group of offices where a number of cases of pulmonary tuberculosis had occurred. Sickness due to catarrhal influenzal colds was highest in those offices in which methods of removing dust were most inadequate, and although I could not trace any direct relationship between the incidence of tuberculosis and the degree of dustiness in the offices, the standard of general health in the cleaner offices was certainly higher than in the dusty ones. If the general health was better, then so was the resistance to disease, and there would be less likelihood of tuberculosis developing.

Certain dusts have a direct bearing on the incidence of tuberculosis. For instance, among the grinders of Sheffield the death-rate from respiratory tuberculosis in 1938 was reported in Parliament (1938) to be four times the rate for all persons over 15 in Sheffield. Further evidence comes from the figures of the Silicosis Medical Board (Sutherland, 1940) for the period 1932–9. Of 1,397 deaths due to silicosis, active tuberculosis was present in 797 cases. Numerous reports have shown that dormant tuberculosis lesions may become active when a simple silicosis has developed. As for the infectivity of dusts in general, complete proof is not usually possible, but Cruickshank (1940), Mitman (1945), and W. F. Wells in America have shown that droplet infection is important in the spread of disease. Coughing and sneezing are particularly mentioned as expelling infected droplets into the air. Dust, by increasing catarrh, may make coughing and sneezing more frequent and so favour the spread of infection.

The importance of working conditions is seen when we consider how the mortality of tuberculosis varies in different occupations (Tables II and III).

TABLE II.—*Deaths Registered 1930–2 per 100 Calculated Standard Deaths at Ages 20–65*

Occupation, Males	All Causes	Resp. Tuberculosis
Non-dusty Occupations		
Stevedores	121	239
Barmen	149	212
Costermongers	140	200
Dockers	137	186
Waiters	134	176
Messengers	125	160
Hotel keepers	155	148
General labourers	127	146
Printers	89	128
Brewers	121	120
Compositors	92	116
Bargemen	121	110
Typists	77	105
Dusty Occupations		
Grinders	240	757
Sand blasters	304	750
Sandstone masons	180	396
Textile warehousemen	234	364
Metal grinders	137	275
Filers	154	260
Kiln and oven men	157	227
Barbers	122	162
Chimney sweeps	136	150
French polishers	110	148
Coal heavers	113	141
Cobblers	98	131
Horse drivers	126	124
Metal moulders	112	112
Plasterers	112	110
Sawyers	92	108
Bakers	78	71

TABLE III.—*Deaths Registered 1931–2 per 100 Calculated Standard Deaths*

Occupation, Single Women	All Causes		Resp. Tuberculosis	
Ages:	20–65	35–65	20–65	35–65
Nuns	110	110	194	256
Tailoresses	95	96	113	136
Charwomen	126	132	94	126
Dressmakers	108	110	124	119
Waitresses	109	111	124	—
Laundry workers	105	103	151	107
Domestics	106	115	84	103
Weavers	103	118	79	86
Typists	68	69	78	84
Sick nurses	78	74	82	81

Light work under bad conditions can be more harmful than heavy work under good conditions, as is seen by comparing the figures for farm labourers, stone quarriers, smiths, and steel forgers with those of hairdressers, barmen, costermongers, and waiters. Heavy work and poor economic conditions are a serious combination—e.g., dockers. With regard to irritating fumes, there is evidence that the inflammatory reaction of the lung to chemical irritants favours the development of tuberculosis. An exception is fumes containing silica. This is supported by the American figures (1919) of 70,552 soldiers gassed in the 1914–18 war, of whom only 173 cases subsequently developed tuberculosis—2.45 per 1,000. The general rate for U.S. soldiers was 3.50 in 1918 and 4.30 in 1919.

Figs. 4, 5, and 6 (compiled from Registrar-General's Returns, 1931–2) show the percentage mortality from tuberculosis of all occupied males in certain industries in relation to various age groups. The mortality is generally higher in the dusty trades, the peak of the curve falling in the 50–55 age group in these, and in the 40–45 age group in the non-dusty and heavy occupations. When similar figures are plotted for the Registrar-General's social class divisions (Fig. 7), in all the occupied classes the peak of mortality falls in the 40–45 age group for

males. It would seem that one factor which shifts the tuberculosis mortality to higher age groups is working in a dusty occupation, and that in such work there is a greater risk of dying from tuberculosis over the age of 45 than in the non-dusty occupations.

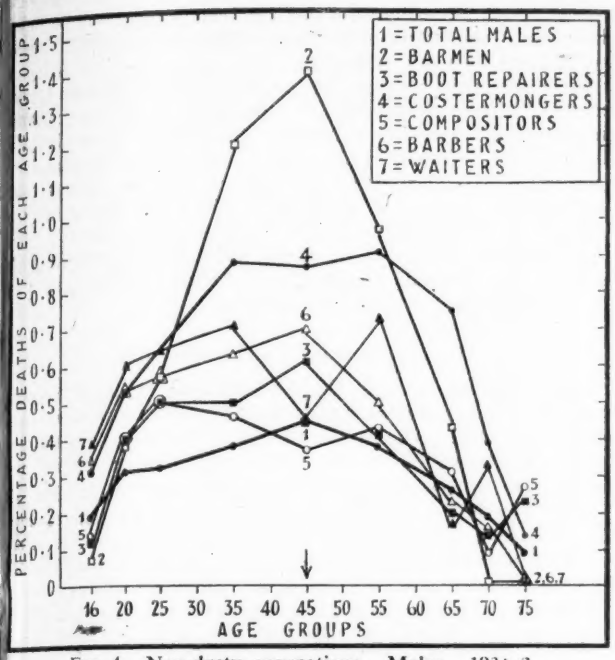

FIG. 4.—Non-dusty occupations. Males. 1931–2.

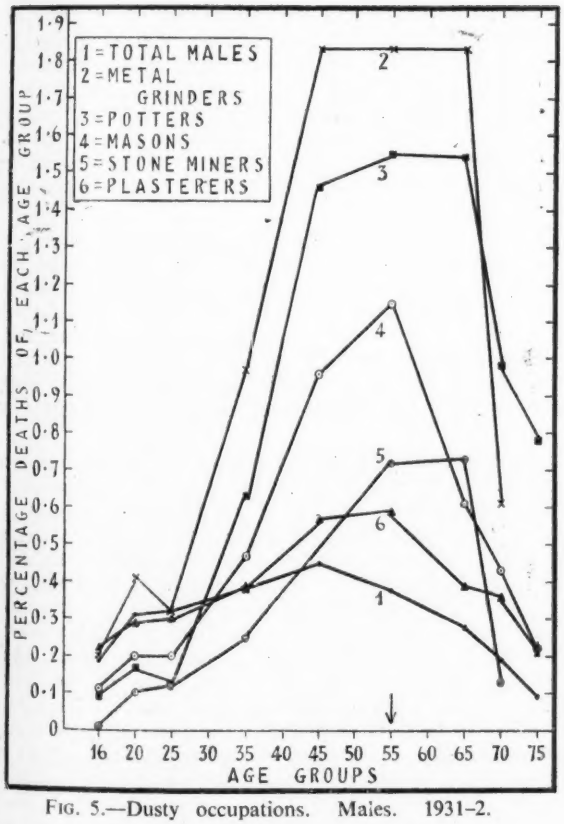

FIG. 5.—Dusty occupations. Males. 1931–2.

Mass Radiography

With primary infection tending to occur in the higher ages the need for discovering active cases becomes increasingly important, and with the development of miniature radiography, better termed fluorography, many unsuspected active cases have been found. In mass radiography surveys the number of cases found positive by smear examination of sputum is approximately 3.5 per 1,000 examined. These need sanatorium treatment, and the quicker they get it the better. The 8 per 1,000 with lesions of clinical significance cause difficulty, and will continue to do so until we have a more accurate method of assessing the degree of activity. At present it is by trial and error that we determine a man's capacity for work, and the allocation of a person with a stationary minimal lesion to modified work, change of occupation, or continuance in his present employment is largely a matter of guesswork.

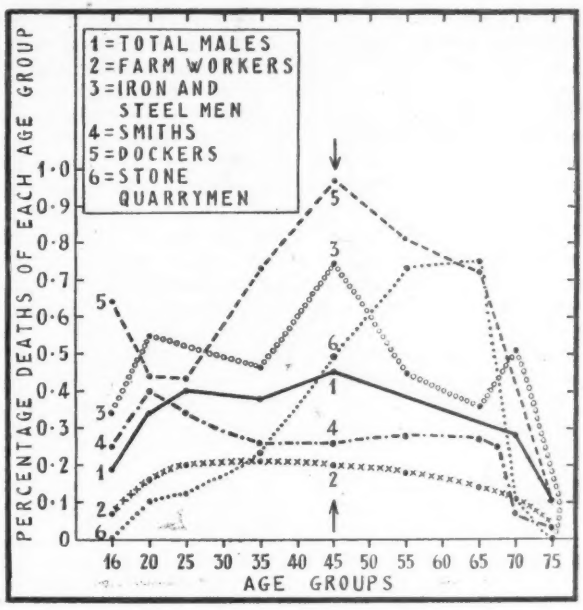

FIG. 6.—Heavy industries. 1931–2.

Curious situations may develop as a result of mass radiography. When the person in whom an active and possibly infectious lesion is discovered refuses to accept advice, the authorities are in a difficult position: the information, being confidential, must not be divulged to the managers of the firm concerned. Occasionally an error of judgment may have been made by the medical staff of the mass radiography unit, and as a result of an abnormal film being pronounced normal the management may retain the man at work, with a considerable occupational risk. Should that worker develop the disease the management might claim justification for their action because of the normal report.

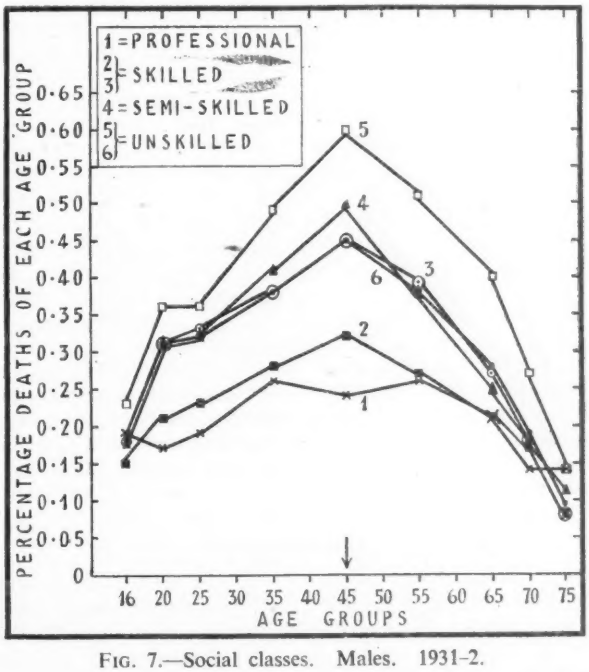

FIG. 7.—Social classes. Males. 1931–2.

The position of the industrial medical officer is somewhat anomalous: he may be informed of the number of individuals

in the works in whom abnormalities have been discovered but must not be given the names of the persons who have tuberculous lesions. A much closer link between the tuberculosis dispensary, the local labour office, and the welfare unit of the firm is required; and a workers' health and welfare committee should be formed where these matters can be discussed without prejudice. In this way suitable employment for a disabled tuberculous person might be arranged in the works without raising criticism. The importance of strengthening the links between the D.R.O., the tuberculosis officer, and the local labour office of the Ministry of Labour is recognized in the Ministry of Health Circular Letter 52/46, May 15, 1946, which states that in future the T.O. must inform the L.O. of every tuberculous person under his care who in his opinion is fit for a measure of employment and needs and desires assistance in finding it, and any patient who may *not* be fit for employment but nevertheless wishes to have advice about employment prospects, registration, and the facilities of the Disabled Persons Employment Act (1944). The T.O. must also furnish, at the request of the D.R.O., medical reports on Form D.P.1(X), and provide facilities for him to visit patients at the dispensary and advise him as to the nature and conditions of work suitable for the particular patient concerned. This is not easy, and much research is needed into the problem of employing the disabled.

There are other situations in mass radiography surveys causing some apprehension—e.g., searching for tubercle bacilli in symptomless cases showing minimal pulmonary shadows. Laryngeal swabs and gastric lavage are producing a high percentage of positive results in these otherwise apparently healthy people. Webster (1943), in his examination of 1,630 cases, discovered by mass radiography among Australian military forces 364 positive cases of whom 189 said they were perfectly well and symptomless after exhaustive investigation. Are we to regard them as active, infectious cases with respect to their employment and need for treatment? Our laboratories must be above suspicion, as serious errors can occur from unsound methods or technique. Personally I think we should take every precaution to prevent the spread of infection and to arrest the disease, for we have a good chance of curing these cases; and that a compromise between employment and treatment while activity exists should be avoided. In the past too much time and skill have been wasted on the impossible task of restoring the advanced case to health when consideration of the morbid anatomy would have caused us to direct our energies to efficient treatment of early cases. Mass radiography is increasing our opportunities to effect permanent cures, and we must not default by relying on the apparently healthy condition of the individual, making a wrong assessment of his capacity for work because we can offer him a light job.

Mass radiography can be of great value in discovering any person with clinically significant shadows in the chest skiagram and eliminating him from occupations in which the risk of developing tuberculosis is high. As mass radiography of the whole population is impracticable, it is best applied to serial examination of those sections of the community in which the tuberculosis risk is highest. Pre-employment radiographic examinations throw a serious responsibility upon employers in hazardous industries, for if tuberculosis subsequently develops in an individual it can be more conclusively attributed to conditions of employment.

Rehabilitation

Great advances are being made in the rehabilitation of the tuberculous by granting financial assistance. Memorandum 266T. of the Ministry of Health provides for financial assistance to pulmonary cases likely to return to work. It is insufficient for his needs, but the principle is right. It is a wartime emergency measure and will probably be abolished when the National Insurance Bill is passed. The industrial section of this Bill is of particular interest as regards tuberculosis. Part iv, clause 54, 2a, states:

" "A disease or injury may be prescribed (for the purposes of this part of the Act) in relation to any insured persons, if the Minister is satisfied that (*a*) it ought to be treated, having regard to its causes and incidence and any other relevant considerations, as a risk of their occupations and not as a risk common to all persons, and (*b*) it is such that, in the absence of special circumstances, the attribution of particular cases to the nature of the employment can be established or presumed with reasonable certainty."

Perhaps the Minister will schedule tuberculosis as an industrial disease, but this is doubtful, and it is probable that every claim will be taken on its merits. As the injury benefit is 19s. per week more than the sickness benefit there will be many claims that tuberculosis shall be considered as an injury. There has already been one ruling in court that a tuberculous lesion is an injury in the meaning of the Act. Our incomplete knowledge of the pathogenesis of tuberculosis will increasingly emphasize the need for a national tuberculosis research board supported by Government funds to investigate tuberculosis problems—particularly the development of the disease and assessing the activity of the lesion. The best solution for the tuberculous would be to enhance the privileges under Memorandum 266T. in favour of all those suffering from tuberculosis and thereby eliminate the need for proving that the disease is due to the nature of the employment.

Disabled Persons Employment Act

The Disabled Persons Employment Act, 1944, is another measure which provides means whereby the tuberculous may be rehabilitated. The full benefits of this Act have not yet been appreciated, as some time must elapse before the machinery for its working is complete, but the Minister of Labour has powers to establish a full rehabilitation scheme. One drawback to the smooth working of the Act is the reluctance of tuberculous persons to put their names on the Disabled Persons Register. The disabled person hides as much as possible his having suffered from the disease for fear of being penalized.

The general opinion of employers is against the inclusion of tuberculous persons in normal industry. Bashford and Scott (1936), after examining the histories of 3,755 cases of pulmonary tuberculosis occurring in a Post Office staff of 185,000 men and 55,000 women, concluded that of those who incur tuberculosis not more than 50% return to work even after prolonged treatment; and that of those who returned to industry there was a further wastage of about 48% from recurrent pulmonary tuberculosis or other forms of ill-health by the end of ten years. The heaviest wastage occurred in the first six years. There was a further wastage of 14% of those who survived the first ten years.

The time has come to treat this problem realistically. Two most important principles are that the employment of the tuberculous in industry must not disturb the relationship between management and labour by introducing special privileges and conditions for a selected few employees, and that the tuberculous person may be employed at work which requires a low energy output, but while he works he must complete his duties, and not expect that he can slack because he is tuberculous.

Employable patients who have received the maximum benefit from treatment are in two groups: (1) sputum-positive, (2) sputum-negative. (1) These are infectious, have an active focus in the lungs, and are particularly liable to relapse if subjected to strain or anxiety. Only exceptionally should they be re-employed in normal industry. They need special workshops and close medical supervision. These can be provided under the Disabled Persons Employment Act. They present a formidable problem. A subsidy is needed to cover their reduced capacity for work, and workshops in the form of industrial clinics where sheltered conditions can be provided. (2) These can be subdivided into three classes: (*a*) fit to resume on full time their occupation or trade; (*b*) fit to resume work on part time; (*c*) cannot resume their occupation or trade but could be employed at other work if properly trained. The first class does not present any difficulty. The second can sometimes be accommodated by large firms, but difficulties over wages and privileges are too great for the small firm. So-called light work often means dead-end jobs with poor pay. Unless there is a prospect of return to full work within twelve to eighteen months it is better for them to be retrained in work within their capacity and skill. It is highly important that the energy output required is within the man's capacity. The research of Orr and Leitch (1938) on the calories expended per hour (Table IV) in carrying out certain tasks should

form a standard by which we can gauge the suitability of any occupation for a particular individual. However, we still seek an easy means of determining the limit of energy output for tuberculous patients beyond which it is unsafe to go. When this is known it will not be difficult to suggest suitable occupations for most patients when sanatorium treatment is completed.

TABLE IV.—*Calorie Requirements of Man (Orr and Leitch)*

Occupation	Calories per Hour
Sewing	10–20
Writing	10–20
Sweeping	110
Stone mason	380
Sawing wood	420
Tailoring	50
Typewriting	55
Bookbinding	65
Stonemaking	90
Painter	160
Smith (heavy)	350
Coal-mining	320
Walking	150–240
Charwomen	81–157
Lecturing	73
Seamstress	6
Dusting	110
Carpentry	155

Those who cannot be re-employed in their previous occupation will have to be given other work, though to maintain the original standard of living is often difficult. Retraining usually means either temporarily or permanently lower wages for the person over thirty. The peak of the tuberculosis-incidence curve in males is shifting to the higher age groups, so this problem is likely to increase. The situation calls for the establishing of centres for the tuberculous similar to Egham, with close connexion with special workshops where continued employment may be obtained for those unable to find suitable posts in normal industry. Considerable advance in the principles underlying the employment of the tuberculous has been made by the Ministry of Labour's agreeing that such persons need not be given outdoor work. Most outdoor jobs are heavy and often poorly paid. It is very satisfactory that this should be recognized and that sedentary work should be arranged.

Russia has successfully linked sanatorium treatment with the prophylactic workshop attached to the main works, which provides modified employment for patients still under treatment at a dispensary or a night sanatorium. Adequate nourishment and rest are ensured, but remuneration is on a lower scale than that of the healthy worker. The scheme is worthy of close study and might be adopted with slight modification here.

Conclusions

To summarize the relationship of industry to tuberculosis: occupation rarely causes tuberculosis, but conditions of labour can predispose to it. These conditions, particularly the elimination of dust, which appears to be more harmful with regard to tuberculosis in the higher age groups, should receive continued attention, and also that all workers should obtain adequate nourishment during work hours. Tuberculous persons entering hazardous employment should be examined periodically by miniature radiography. A fundamental principle is the exclusion of infectious persons from normal industry, except where the other workers can be protected and suitable employment provided for the disabled person. Pre-employment radiography imposes a liability on the employer when engaging proved healthy persons in a hazardous industry. The return of the tuberculous person to normal industry must be through a properly organized rehabilitation scheme, which should be closely associated with industries that can provide suitable employment for recovered persons. Recent legislation has made this possible, but the co-operation of industry as a whole is needed to ensure success.

A national tuberculosis research organization would investigate methods for assessing the disability of those who are recovering or have recovered from the disease. The Government has accepted its share of the liability; it is now our responsibility to take advantage of the privileges provided and develop this section of industrial medicine. Special workshops or industrial clinics are required for those who cannot take their place in normal industry; indoor work within the disabled person's capacity is more suitable than outdoor, which is usually heavy and poorly paid.

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THE INTERNAL COMBUSTION ENGINE AND THE SPREAD OF DISEASE

BY

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From the dawn of history infectious diseases, together with other specialized merchandise, have spread along the trade routes of the world, whatever the mode and speed of transport. To-day it is the speed of travel both on land and in the air which adds danger to the spread of disease from endemic to non-endemic areas. Fifty years ago, when the first European missionaries went to Uganda, it took them between three and four months to walk from Mombasa; to-day the same journey can be made by air in from three to four hours. Flights of twenty-four hours for a journey from West Africa to India or of sixteen hours from England to West Africa are becoming commonplace. With jet-propelled planes the flying times will be even shorter; speeds of 500 to 600 m.p.h. (800–960 km.p.h.) for passenger planes are predicted in the near future. But it is not only in the air that the barriers to rapid intercourse have fallen. A generation ago few Africans dared to wander far from their tribal lands: if they did, it was at the risk of death, or at the best enslavement. Mountains once formed an insuperable barrier. In the old days, for instance, the Nyakyusa in East Africa feared to cross the 8,000-ft. (2,438-m.) range which blocks their valley to the north, since they were liable to die from cold. Disease was also a barrier, for the same tribe did not often visit the adjoining Kinga, who live on the Livingstone Mountain, not only because of the cold but because they were afraid of catching tick fever, which was endemic among the Kinga (Wilson and Wilson, 1945). One small tribe in the Nuba Mountains, in south-eastern Kordofan, are said to have introduced tsetse flies in order that the Baggara, or Cattle Arabs, should give them a wide berth. Evans-Pritchard (1940) relates that the Galla and Amhara of the Ethiopian highlands refuse to descend to the plains for any length of time for fear of malaria. Immediately before the war, and still more during the war, motor roads have been built throughout the Tropics in ever-increasing numbers. Shakespeare's prophecy that "the vasty wilds of wide Arabia are as thorofares now" is no less true of Africa and Asia, and the local inhabitants have readily taken advantage of those roads and of the motors which pass along them. There is evidence that in the past few years in Africa yellow fever, cerebrospinal fever, relapsing fever, trypanosomiasis, intestinal bilharziasis, and gonorrhoea have all been spread by those who have used the roads in their search for work or trade.

The possibility that infectious diseases and their insect vectors might take advantage of the rapid means of transport now available was translated into fact when in 1930 Shannon discovered *Anopheles gambiae* in the city of Natal, Brazil; it had apparently arrived from tropical Africa, where it is the most important malarial vector, not by air but by one of the fast torpedo-boats employed in connexion with the French transatlantic air service.

In 1933 the first International Sanitary Convention for Aerial Navigation was drawn up; but in many ways it was unworkable, and in 1944 some of its provisions were modified in the light of more recent knowledge. During the war the possibility that infectious diseases or their insect vectors might be carried from endemic to non-endemic areas was met in the more dangerous areas of Africa by the formation of inter-Allied mosquito control boards, the membership of the boards being

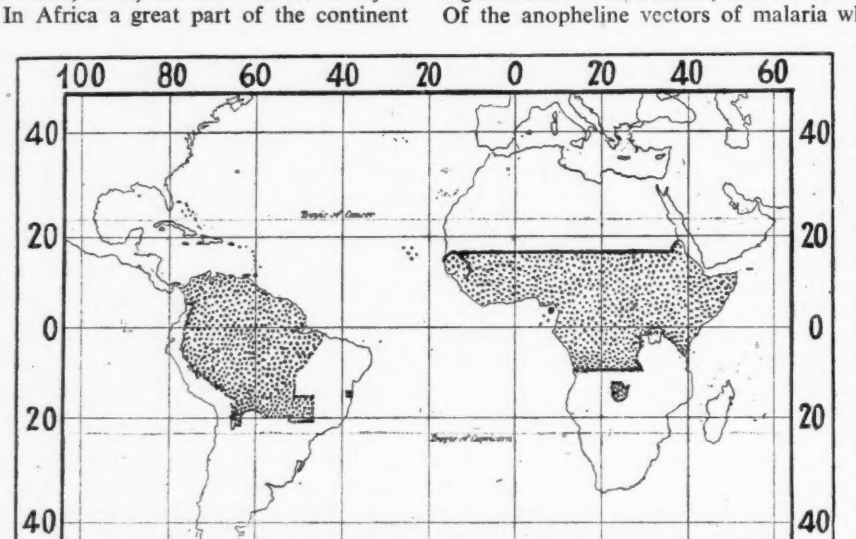
made up of civilian officials and Allied Service personnel. With the end of the war these control boards have in most cases lost their Service members, together with many of their executive staff. Although for the moment there is probably a decrease in the number of persons flying, in a short time the world's air routes will once again be crowded with passengers and freight. The present is, therefore a suitable time to discuss very briefly how far the present organization is adequate to guard against the spread of disease by air.

Disease and its Spread by Air

The diseases which are specially feared in relation to spread by air traffic are yellow fever and malaria. There are, however, others which might readily be spread by infected persons or by insect vectors—for example, dengue, poliomyelitis, the insect-transmitted encephalitides, and trypanosomiasis, as well as acute respiratory infections such as influenza.

Yellow Fever

Yellow fever may be carried by an infected mosquito or by a person incubating the disease. The endemic yellow fever zones in Africa and South America, shown in the accompanying map (U.N.R.R.A. Health Division, 1945) are now traversed by a number of air routes. In Africa a great part of the continent between 15° N. and 10° S. is involved, but Tanganyika is excluded. The Barotse Province and the Balovale district of Northern Rhodesia are, however, included, as are the islands in the Gulf of Guinea. The Port of Massawa, in Eritrea, has been excluded.



The epidemic yellow fever areas of the world as delineated by the expert commission on quarantine, U.N.R.R.A. Health Division.

In South America the ports of Belem in Brazil, Cayenne in French Guiana, Paramaribo in Surinam, Georgetown in British Guiana, the Caribbean ports of Colombia and Venezuela, and the cities of Caracas in Venezuela, Bogota in Colombia, and Corumba in Brazil are excluded. In addition, the Ilheos and Itabuna districts in the State of Bahia, Brazil, are for the time being regarded as endemic yellow fever areas.

It will be seen that the portion of the earth where yellow fever is endemic is too large to be absolutely avoided by long-distance aeroplanes, although in the future it may be possible for aeroplanes to fly the 4,000 miles (6,400 km.) from Cairo to the Union of South Africa without touching down inside the yellow fever area.

Experiments made before the war by Trolli (1932), Hicks and Chand (1936), and others showed that mosquitoes could quite easily survive long journeys by air of over 9,000 miles (14,400 km.) in which heights of 10,000 to 12,000 ft. (3,048–3,658 m.) were reached. Griffitts (1933) also proved that mosquitoes released in the cabins of aeroplanes do not necessarily leave the aeroplane at intermediate stops on the air route. Before the war a number of mosquitoes from the Old World, capable of transmitting yellow fever, had been found in aeroplanes (Whitfield, 1939), including *Aëdes aegypti, A. simpsoni, A. luteocephalus, Taeniorhynchus* (*Mansoniodes*) *africanus,* and *Culex fatigans.*

While the chances of an infected mosquito gaining entrance to an aeroplane may not be great, they are by no means remote. With compulsory yellow fever immunization for all those who fly through endemic zones the chances of an infected person being carried are, however, extremely small, provided that active yellow fever vaccine has been used.

Malaria

Malaria may also be spread by a person with parasites in his blood or by the carriage of some of its insect vectors. It is now recognized that different strains of the same species of malarial parasite exist, some being more virulent than others. The introduction of highly virulent strains of *falciparum* parasites into an area where *vivax* strains were predominant might or might not be followed by a severe outbreak of malaria; the experiment has not been tried. After the war of 1914–18 a small outbreak occurred in South-East England as a result of the return of infected soldiers, and a similar outbreak has already taken place in the Berlin area. A number of the anopheline vectors of malaria were found in aeroplanes in Africa and in America both before and during the war. The list includes *Anopheles gambiae, An. funestus, An. pharoensis* and *An. albimanus.* While the original appearance of *An. gambiae* in the New World was not directly due to aeroplanes during the war years it did successfully make the Atlantic passage by air. The difficulties in eradicating it from Brazil have been retailed by Soper and Bruce Wilson (1943). There is also some evidence to show that *An. albimanus,* found breeding at Boca Paton, Florida, arrived from South America by air. Of the anopheline vectors of malaria which have travelled by air, *An. gambiae* is probably the most dangerous in view of its domesticity and its catholic taste in breeding-places. At present it is found throughout Africa south of the Sahara and as far north as Wady Halfa, just south of the frontier between Egypt and the Anglo-Egyptian Sudan (Lewis, 1942, 1944). It is probable that it has been at Wady Halfa for many years. It has, so far as is known, never reached the Nile Delta, though during the war it was found in Central Egypt. *An. gambiae* is present in Madagascar and has been identified in the Aden hinterland and at Jeddah, in Arabia.

Other Diseases

Tsetse flies are inveterate travellers by train, motor-car, and even on the back of the humble pedal cyclist. It is therefore not surprising that they should have been found in aeroplanes in Africa (Symes, 1937). During the war on two occasions *Glossina palpalis* were also caught in Natal, Brazil: their only means of crossing the Atlantic must have been by air (Soper and Wilson, 1943). Chaga's disease has not been reported outside the New World.

Other diseases transmitted by mosquitoes are dengue and the various forms of encephalitis at present limited to America and Japan. There was, however, before the war some evidence that Japanese Type B encephalitis had spread into China. Flies are frequent passengers in aeroplanes: they are, it seems, able to carry poliomyelitis and probably infective hepatitis. Strains of poliomyelitis are known to vary in virulence, while it is also possible that there are different strains of infective hepatitis with varying degrees of virulence. The geographical distribution of sandfly fever and kala-azar by no means coincides with that of *Phlebotomus.* Plague transmission is a more remote danger, though during the war a live mouse was found in an aeroplane arriving at Miami, Florida, from San Juan, Porto Rico.

Prevention of Spread of Disease by Aeroplanes

The measures which are necessary to prevent the spread of insect-borne diseases by aeroplanes are of course well known

and if they are carried out properly should make the risks infinitesimal. These measures are the sanitary control of (*a*) aerodromes, (*b*) aeroplanes, and (*c*) air-passengers, crews, and ground-staff.

The sanitary control of aerodromes requires a considerable staff. For aerodromes dealing with international traffic the areas involved are large: runways 3,500 yards (3.2 km.) long are required, and extensions up to 5,000 yards (4.5 km.) are visualized in the future. The existence of many acres of flat tarmac and of large hangars means that in the Tropics during the wet season a tremendous volume of rain-water often has to be run off the aerodrome area. Scouring of drains and soil erosion have to be guarded against. Mosquito control must be exercised not only over the actual aerodrome but over a zone of country extending in some directions for as much as three miles (4.8 km.), if during tropical storms mosquitoes from uncontrolled areas are not to be blown on to the aerodrome. This involves the spraying of native villages, and in some cases of urban areas, with D.D.T. or other insecticides, as well as the careful supervision of drains, lagoons, and all other possible breeding areas. It is obvious that a large staff is required. During the war many extensive drainage schemes were begun in Africa in order to sanitate aerodromes. Some of these schemes were finished before the end of the war, other were left unfinished. In any case anti-mosquito schemes cannot look after themselves; constant vigilance is necessary, and the cost of maintenance is usually high.

The sanitary control of aeroplanes involves the use of insecticides. The ideal method is undoubtedly the application of an insecticide to the inner walls of the aeroplane (Madden *et al.*, 1945), combined, while in flight, with some form of aerosol spray containing a rapidly acting insecticide such as pyrethrum (Mackie and Crabtree, 1938). During the war, when the Freon bomb or a hand-spray was the standard equipment, disinsectization was not as a rule carried out till the aeroplane had been grounded, and then often in so perfunctory a manner that insects had ample opportunity either to leave the aeroplane or to remain in it alive for a further journey.

The sanitary control of passengers, crews, and ground-staff involves immunization against yellow fever. In accordance with the International Sanitary Convention for Aerial Navigation of 1933, as modified by the Convention of 1944 (Stock, 1945), all passengers and crew must have been immunized not less than ten days and not more than four years before the date at which they enter the yellow fever endemic zone.

Before the war, when yellow fever immunization was still in an experimental stage, the majority of persons inoculated were tested for immunity. Under wartime conditions this became impossible. Some tests, however, were carried out in West Africa with discouraging results. Thus of 156 British officers and other ranks inoculated within six months in 1943, 83 were protected while 73 were not. There were two reasons for these results: (*a*) failure to remove residual moisture from the vaccine during the process of preparation, and (*b*) maltreatment of the vaccine after leaving the place of manufacture. The first difficulty has now been completely overcome, and further tests show that between 97 and 98% are successfully vaccinated. Maltreatment of the vaccine has occurred in a number of ways: breakdown of refrigerating plant used for storage of vaccine; inefficient vacuum flasks for its transportation; the use of hot syringes for injecting the vaccine; and exposure of the redissolved vaccine to high temperatures. The following figures show the results of using an inefficient vacuum flask for transporting yellow fever vaccine (Batch A) some 50 miles (80 km.) by road in West Africa. Tests were made a month after immunization, and all injections were carried out by the same pathologist.

Batch	No. of Persons Protected	No. of Persons Not Protected
A	44	21
B	17	1
C	15	1

Since the yellow fever vaccine is thermolabile it is obvious that considerable care must be exercised in its storage and handling.

Yellow Fever Certification

All passengers by air who are travelling through endemic yellow fever zones must now carry a certificate that they have received yellow fever vaccination more than ten days before the date at which they enter the endemic yellow fever zone and not longer than four years. At present an international yellow fever certificate is printed by the World Health Organization, following U.N.R.R.A., who had issued a booklet, appropriately bound in yellow, containing a yellow fever certificate. A few minutes' search, however, at an aerodrome allowed seven different types of British yellow fever certificates to be collected, all signed by different medical officers. Since those who examine yellow fever certificates are not always provided with specimens of these various types or with a list of the medical officers who are empowered to sign such certificates, it is not surprising to learn that yellow fever certificates have in the past been forged and that it is reported on credible information that on the Continent there is a black market with a recognized tariff for these certificates. It is therefore obvious that to prevent the forgery only one form of yellow fever certificate should be available, while lists of the medical officers whose signatures are accepted should be kept in every airport.*

The International Sanitary Convention for Aerial Navigation of 1933 as amended by the Convention of 1944 (Stock, 1945) provides for the isolation of persons who do not hold a valid anti-yellow-fever inoculation certificate and who are travelling by air from an endemic yellow fever area to one in which the disease does not exist but in which conditions may permit of its development. Such persons may be isolated in screened quarters until such a certificate becomes valid or until six days shall have elapsed, whichever is the lesser period. The Convention also provides that in exceptional cases the countries signatory to the Convention may issue "certificates of urgency" to persons not immunized against yellow fever "whose unobstructed passage is absolutely and immediately essential on grounds of high policy, certifying that a passage without hindrance to the bearer of the certificate is urgently necessary."

As a wartime emergency such a measure was doubtless essential. In Crown Colonies the right to grant certificates of urgency was vested in the governor, but in practice it involved the granting of these certificates by the governor's deputy, the Colonial Secretary, or his deputy, and in fact by a considerable number of persons in each secretariat. The Governments of the Union of South Africa and of Southern Rhodesia have now very wisely refused to accept these certificates of urgency, the use of which should be everywhere abolished.

During the war, in order to reduce the risk of any person in the incubation period of yellow fever coming within controlled aerodrome areas all ground staff as well as casual labourers were immunized. In some areas this involved the immunization of a considerable proportion of the population of villages and towns in proximity to aerodromes.

Need for an International Organization

The organization which dealt with the sanitary control of aerodromes and aeroplanes during the war has now largely been dispersed, but peace has not brought a solution of these problems, which remain as urgent as ever. Yet many of the countries which find themselves on international air routes have neither the staff nor the money to devote to matters which are not their primary concern. There are three possible solutions. It may be thought that the danger of the spread of infectious diseases and their vectors is negligible and that therefore there is no need to have any special organization to deal with air transport. This point of view, in face of the International Aerial Sanitary Convention of 1933, amended in 1944, can hardly be maintained. It may be thought that there is a danger but that it is safe to allow each separate country to have complete control over the international aerodromes in its own territory. In view of the many loopholes which became apparent during the war, and of the meagre resources possessed by many countries for dealing with international air traffic, it seems that the only really satisfactory organization is an international one with an adequate staff and funds of its own. This concern might well be placed under the World Health Organization of the United Nations, and in close association with P.I.C.A.O. (the Permanent International Civil Aviation Organization). Its functions would be: (1) To take sanitary control of all aerodromes and aerodrome areas which are considered to be involved in the spread of infectious diseases from endemic to non-endemic areas; (2) to control the disinsectization of all aeroplanes on routes where spread of infectious diseases is likely to occur; (3) to control the storage

* The Government of India now insists that valid yellow fever certificates must be signed only by approved persons, and other Governments are adopting the same procedure.

of yellow fever vaccine and its injection under standardized conditions, and to approve institutes for the testing of yellow fever vaccines; (4) to control the issue of yellow fever immunization certificates.

So far as the sanitary control of aerodromes and aerodrome areas is concerned, this implies something more than the biannual meeting of government officials which before the war occurred at the Office International d'Hygiène Publique in Paris. It would involve a partial abrogation of sovereignty on the part of the territories concerned, since the sanitary staff engaged in this work would be responsible not to local directors of medical services but directly to the World Health Organization of the United Nations.

In the age of the internal combustion engine the spread of disease can be held in check only by a scheme which is internationally sponsored and internationally controlled.

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ABACTERIAL PYURIA

WITH SPECIAL REFERENCE TO INFECTION BY SPIROCHAETES

BY

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AND

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The problem of sterile, amicrobic, or abacterial pyuria is occasionally brought up in medical publications in relation to a new case observed. It is a problem that has interested us for several years, and we have published some papers on the subject in Chilean medical journals (Vargas-Zalazar, 1937; Coutts, 1938; Coutts and Vargas-Zalazar, 1945); our findings, however, may not be generally known. In our opinion "abacterial" is the right designation for this syndrome, which may originate through ascending or descending infection of the urinary tract by viruses, spirochaetes, or protozoa. In most cases causative diagnosis was not made because dark-ground observation of centrifuged urinary deposit of bladder or kidney urine samples has not been incorporated into routine laboratory practice.

We refer later to cases of abacterial pyuria, which according to our findings are produced by spirochaetes. Our first suspicion of the possible action that some of these micro-organisms might have in the production of such a type of pyuria was aroused more than ten years ago.

A medical student consulted us for slight dysuria and cloudy urine, in the absence of urethral discharge, which had been troubling him for a few days. Prof. Bisquertt-Torres, who had charge of the case, found pus cells but no bacteria of any kind in urine obtained direct from the bladder. Cystoscopy revealed only a slight congestion of the trigone. Bilateral kidney-pelvis catheterization performed on two occasions showed numerous pus cells but no bacteria. Cultures and animal inoculations of urine from both kidneys and bladder failed to reveal Koch's bacilli. At the time Bisquertt-Torres and one of us (Coutts) thought that the most probable diagnosis was that of bilateral renal tuberculosis. Before travelling to Switzerland the patient visited his dentist, who removed a gold-filled molar which was somewhat tender on pressure and showed a certain amount of apical damage in a radiograph. Urinary symptoms then subsided rapidly, the urine cleared, and the pus disappeared. He now a well-known physician, is married, has several children, and enjoys good health.

In 1937 Vargas-Zalazar, at one of the weekly staff meetings of our clinic, presented a case of abacterial pyuria. In the discussion Coutts, remembering the above case and some similar ones presented by Wildbolz at the French Congress of Urology in 1933 and treated successfully with arsenicals, suggested a search for spirochaetes in urinary deposits observed under dark-ground illumination. These micro-organisms might proceed from the oral cavity or intestinal tract. In this case spirochaetes were discovered. On perusing the medical literature we found that Briggs (1935), Cook (1936), and Wildbolz (1937) had treated similar cases of abacterial pyuria successfully with arsenicals.

The following is a summary of five cases of abacterial pyuria in which we were able to demonstrate spirochaetes or spirilla under dark-ground illumination of deposit from centrifuged bladder urine obtained by catheter.

Case Reports

Case 1.—A male student aged 21 consulted Vargas-Zalazar privately in 1937. He had undergone tonsillectomy at 8 years of age. His present illness began in 1934, when, after gonorrhœa complicated by epididymitis, his urine on complete bacteriological recovery remained cloudy and contained pus cells. The attending urologist studied the case from a renal point of view and found abacterial pyuria in both kidneys. Investigations for Koch's bacilli were all negative. As the patient felt no symptoms he abandoned further medical care. In 1937 renewed urological studies by Vargas-Zalazar gave similar results. An intravenous pyelogram revealed a right hydro-uretero-nephrosis. Dark-ground investigation of bladder urine showed the presence of large numbers of spirilla. He was treated with one dose of 0.15 g. and three of 0.3 g. neosalvarsan, and in twenty days pyuria and spirilla disappeared from the urine. Later controls have proved his cure to be complete (Vargas-Zalagar, 1937).

Case 2.—A merchant aged 47 consulted Coutts in 1937 because for two months a slight urinary diurnal frequency and tenesmus had been troubling him. His urine was cloudy and did not clear, nor did symptoms disappear after two successive courses of prontosil album. On examination there was no urethral discharge, the urine was cloudy, and the prostate and genitalia were normal. Bladder urine contained numerous leucocytes and some red cells but no bacteria. Koch's bacilli were not seen. The bladder capacity was 150 ml., and the ureteral orifices were normal. On the trigone and right wall several aphthoid lesions were observed. Dark-ground illumination of the bladder urine deposit revealed numerous spirilla. Methylene-blue instillations into the bladder and three injections of a pentavalent arsenical intravenously cured him. When last seen he was in perfect health and his former trouble had not recurred (Coutts and Vargas-Zalazar, 1945).

Case 3.—A woman aged 34 entered our clinic in 1938. Her previous history was of no importance. The present illness began fourteen months before with slowly increasing urinary frequency by day and night. Terminal haematuria was occasionally present. The bladder urine contained pus and cocci, but Koch's bacillus was absent from several samples. The bladder capacity was 40 ml.; there was intense congestion of mucosa with numerous disseminated ecchymotic spots and patches, some covered by exudate. Local treatment was unsuccessful. Dark-ground examination of bladder urine deposit showed numerous spirilla. Arsenic and bismuth combined cured the condition rapidly (Bisquertt-Torres, 1938).

Case 4.—A married hospital nurse aged 32 began in 1940 to have painless haematuria lasting for two days. There was a similar recurrence in December, 1941. As the loss of blood was not stopped by treatment she was admitted to our clinic. Her bladder urine always showed red cells and a few pus cells but no germs. Koch's bacilli were never found. Blood pressure and coagulation tests were normal. Bilateral renal catheterization on two occasions showed blood in both kidney pelves and very slight pyuria but no bacilli. Koch's bacilli were not found. A descending pyelogram proved normal. Dark-ground examination was positive for spirilla (bladder urine). She was treated with pentavalent arsenic by mouth, and haematuria then disappeared. In November, 1944, haematuria reappeared, and spirilla were found in bladder urine. She was cured with stovarsol and was sent to her dentist (Coutts and Vargas-Zalazar, 1945). Up to the time of writing she had relapsed once again.

Case 5.—A physician aged 49 consulted Coutts in 1946 for dysuria and cloudy urine. Five days previously a dead nerve was removed from the canal of an upper median incisor. A few hours later the upper lip started swelling, and twenty-four hours later an abscess of the anterior portion of the gum was drained surgically. Bladder

symptoms started shortly afterwards. There was no urethral discharge; pus was present in the urine, but no bacteria. Under dark-ground illumination a few spirilla were found. He had been taking sulphonamides. Stovarsol was given by mouth; bladder symptoms subsided and pus disappeared from urine.

Discussion

Cases of abacterial pyuria, besides those already quoted, have also been studied by Schaffhauser (1937), Houtappel (1939), Moore (1940, 1943), Cook (1944), Donovan (1945), Peters (1946), etc. Most of them have been cured with arsenicals, but in no case have spirochaetes been proved to be their cause, although they have often been considered as the possible aetiological agent. Peters (1946) brings this problem up again; because of the prompt therapeutic action of neoarsphenamine he believes that the causative organism belongs to the spirochaete group. The spirochaete, he thinks, has escaped identification, probably because of some morphological peculiarity. Except those published by us (Vargas-Zalazar, 1937; Coutts, 1938; Coutts and Vargas-Zalazar, 1945) only one case of pyuria by spirochaetes appears in the medical literature; it was also studied at the clinic here and reported on by Bisquertt-Torres (1938). According to our observations bladder and kidneys may become infected by the ascending or the descending route. Spirochaetal (non-syphilitic) infection of the male and female urethra is not uncommon. Descending infection is usually of the blood-stream type. Spirochaetes have been found in bladder urine in cases of so-called war nephritis (Salomon and Neveue), in trench fever (Nankivell and Sundell), in relapsing fever (Chung), and in Weil's disease. In our opinion the spirochaetes present in our cases might have a buccal or intestinal origin. Pettit (1928) considered the possible buccal nature of spirochaetes discovered by Croveri in stools; Buttiaux (1930) found them in stools of patients suffering from colitis; Doenges (1938) found them in gastric glands in 45% of 103 samples of stomachs selected from 3,400 necropsies; Kritchewski and Séguin (1923) found them in cases of retrograde pulpitis; Cavalié and Mandoul (1921) in alveolo-dental expulsive polyarthritis; Gins (1942) in cases of periodontitis; Saenz de la Calzada (1934) describes a case of urinary frequency of dental origin; Ferreira (1939) reports a case of metastatic infection of the prostate from a dental focus; Goldberg (1943) describes prostatitis and arthritis of dental origin.

In all our cases we found spirilla of diverse morphology; some were slender and had only a few spirals, while others were very similar to *Sp. dentium*. We believe they belonged to the buccal flora, but we have no further evidence of this. Treatment with pentavalent arsenicals was always successful. All cases were submitted to dental attention. In order to demonstrate the presence of these fragile micro-organisms we recommend slow and prolonged centrifugation of freshly obtained bladder urine. Before examining the deposit under dark-ground illumination it is advisable to add a drop of normal saline at 37° C. in order to increase the movements of the parasites.

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Ascorbic acid preparations may now be supplied to the welfare departments of factories. The Directorate of Medical Supplies of the Ministry of Supply, Portland House, Tothill Street, London, S.W.1, has taken over the supply and distribution of these preparations.

PERIPHERAL NERVE INJURIES

RECENT PROGRESS IN TREATMENT

BY

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The importance of peripheral nerve injuries in modern warfare is shown by the fact that Spurling and Woodhall (1946) estimate that there were 25,000 peripheral nerve injuries in the second world war, and that they formed 10.5% of battle casualties. There are no fewer than 7,000 end-to-end sutures in the U.S. Registry of Peripheral Nerve Injuries, which was established in November, 1944, to follow up these injuries and assess at regular intervals the results of treatment.

While the final results will not be available for some years, the preliminary reports of surgeons in both American and British neurosurgical teams and centres are of great value and convey information which must influence the future treatment of this type of injury. The opinion expressed in the *Report on Peripheral Nerve Injuries* which was published after the first world war (1920), that the results of treatment are largely independent of the interval between wounding and surgical repair, had already been disproved, as regards *delayed* suture, by the poor quality of the clinical results and the underlying reasons for failure explained by the important experimental work carried out during the last few years. Thus Holmes and Young (1942), Sanders (1942), and other workers showed that the poor results after delayed secondary suture were due to shrinkage of the neurilemma tubes in the peripheral segment, which delayed maturation of the down-growing axonal fibres; and Gutmann and Young (1944) found that with delay there is progressive atrophy in the muscle fibres and end-plates, so that the new fibres returning down the tubes are, after some months, unable to re-enter the old nerve plates. The resulting pattern of innervation is then far from normal, and many muscle fibres never recover at all.

It was therefore fully realized that delay in suturing was certain to lead to reduced efficiency of regeneration, but there was no unanimity concerning the respective advantages of primary and early secondary suture. The obvious arguments in favour of some delay in suture were: (1) to give time for at least some absorption to take place of the degeneration products in the neurilemma tubes in the peripheral segment and at the site of division; (2) Tello and Cajal's view that the new fibres are drawn into the peripheral stump by chemical attraction set up by the degenerated products, which reached its height two to three weeks after division of the nerve; (3) the possibility that the Schwann cells which line the walls of the neurilemma tubes regenerate rapidly after division and aid down-growth of the axonal protoplasm.

Cajal's views were adopted by Duel and Ballance (1932) with considerable success in experimental work on monkeys and in human beings, in whom Duel used degenerated autografts to repair defects in the facial nerve. These problems were, however, reinvestigated by Bentley and Hill (1936), who failed to find any evidence in favour of Tello and Cajal's theories, and their views are supported by Sanders and Young (1942). Abercrombie and Johnson (1942) and Young (1942) do not agree with these adverse findings regarding the advantages of predegeneration, and their conclusions accord more closely with the clinical results, about which there can be no dispute. These authors found evidence that degeneration of the nerve fibres caused activation of the Schwann cells, which reached its peak between the 19th and 25th days after section; and, since Schwann cells probably play an important part in forming the junction when severed nerves are repaired, they will be more active in joining together two nerve stumps if the nerve suture or nerve graft is left a few (say 10 to 20) days to degenerate before making the repair. "In this way there would be less likelihood that the Schwann cell junction will be hindered by the prior development in the suture line of serious fibrosis. The same argument indicates the use of predegenerated grafts, providing predegeneration is short (10 to 20 days)."

Advantages of Early Secondary Suture

The clinical results furnish strong evidence in favour of early secondary as opposed to primary suture. Zachary and

Holmes (1946) analysed 49 cases of primary suture from a clinical standpoint, and concluded that the general standard of recovery after early secondary suture is better than after primary suture. Thus, in comparable groups, 4 out of 12 early secondary sutures of low lesions of the ulnar nerve reached nearly complete recovery, even of the intrinsic hand muscles, whereas only 2 of 13 primary sutures reached the same stage; and one of these patients was aged 7, which favoured the primary suture results, as it is generally agreed that the prognosis of nerve suture is considerably better in young individuals.

The preliminary report of the American Army neurological surgeons Spurling and Woodhall (1946) offers still more convincing evidence in favour of early secondary suture. Their figures show that primary suture resulted in 22.4% of failures, whereas early secondary suture after the wound had healed had only 5% failures, and primary healing of the wound took place in 98% after the secondary operation for formal nerve repair. They conclude that, while the results of early nerve suture show a promising trend toward normal regeneration in most of the cases treated, the high incidence of failure in primary nerve suture has been clearly proved and substantiates the directives forbidding this procedure issued during the war in the European theatre of operations. We must therefore conclude that primary nerve suture at the time of wound excision is inadvisable, the best results being given by early secondary suture as soon as the wound is healed and, if possible, in the period two to five or six weeks after injury.

There is, however, not the same agreement concerning the treatment of the nerve stumps at the time of wound excision. Spurling and Woodhall recommend that they should be roughly approximated by a sling suture, but Thomson *et al.* (1946) found that retaining sutures were harmful, because they increased the amount of fibrosis within the nerve ends and were of negligible help to the operator in subsequent identification. They consider that the nerve ends should simply be placed under the adjacent muscles for protection. The efficiency of wound excision and chemotherapy in the forward areas was manifested by the fact that comparatively little scarring was found when early secondary suture was performed in the 1,500 cases recorded by Spurling and Woodhall, so that the stumps were readily mobilized and the gaps that could not be closed by end-to-end suture amounted to less than 1%. Sufficient mobilization to ensure coaptation of the nerve ends without any tension may necessitate an extensive dissection, which is of course inadmissible at the time of wound excision, both in surgery of warfare and in that of civil life.

Spurling and Woodhall emphasize that every surgeon who participated in peripheral nerve surgery was instructed in the following generally accepted principles:

1. The suture line must be free from tension, this result being accomplished by extensive dissection, with transplantation of the proximal and distal nerve segments if indicated, rather than by excessive and unphysiological flexion of the contiguous joints.
2. The proximal and distal ends must be accurately trimmed until grossly normal nerve ends were visible.
3. The transected ends must be approximated by a very carefully performed interrupted epineural suture. The use of a transneural or sling suture was left for the surgeon to decide.
4. Rigid haemostasis was mandatory, and was to be accomplished without the use of a tourniquet unless required by an associated vascular lesion.
5. Nerve lesions other than division were to be treated by strict conservatism.

Tantalum wire 0.003 in. (0.076 mm.) swaged upon atraumatic needles was recommended as suture material, but was not mandatory. Fine silk could be used if preferred, or if tantalum wire was not obtainable. Tantalum wire has the advantage of being radio-opaque, which, in some cases that failed to recover function, was found helpful as evidence of disruption of the nerve ends. The use of fibrin film and clot (Singer, 1945), with a tension suture only, to fix the nerve ends together does not appear to have improved results, and Thomson found that they increased fibrosis.

Gum acacia 50% has proved successful to fix skin grafts in place (Rubin, 1945), and has also been used to glue nerve ends or cable graft strands together (Klemme *et al.*, 1943).

Causes of Failure of Primary Repair

Zachary and Holmes's analysis of the causes of failure in 19 cases of primary suture which they explored is instructive. They excluded from their total number of 49 cases no fewer than three cases in which they found that the nerve had been sutured in error to a cut tendon which were referred to the Wingfield-Morris Peripheral Nerve Injury Centre. Every surgeon has encountered similar gross mistakes of this kind, and it is not surprising to note that these authors regard poor technique at primary repair as the principal cause of failure. As primary nerve suture is definitely contraindicated as an emergency procedure, it would be productive of better results if all cases needing peripheral nerve surgery were, whenever possible, referred to special neurosurgical centres, where formal early secondary repair could be carried out by those with special experience and interest in this branch of surgery.

In carrying out early secondary suture, the proximal and distal segments of the nerve should be identified in their undisturbed surroundings above and below the lesion. Before the nerves are displaced a single marking stitch of black silk should be inserted through the epineural sheath near their cut ends to prevent axial rotation, as there is a definite possibility that the inferior results in suture of a mixed nerve, such as the ulnar, may be due to "shunting" and inability of the larger motor fibres to grow down the smaller sensory neurilemma tubes which may lie opposite them if rotation should have occurred.

Inadequate resection of the nerve ends is the next most common cause of failure, and the ends must be cut back with a fine sharp knife or razor blade until rounded glistening fasciculi are exposed in both segments. The pattern of the fascicular bundles in the ends of the nerves is then matched as nearly as possible, and close apposition made by interrupted fine silk sutures which include the epineural sheath only. The line of union must be accurate, as otherwise the regenerating fibrils will escape from the junction and form a neuroma with subsequent loss of function. Secondary suture is facilitated and rendered more secure by the thickening of the epineural sheath, which is well marked two or three weeks after division.

When loss of nerve function follows contusion without an open wound, greater difficulty is encountered in assessing the degree of injury, and we may, because of the hope that spontaneous recovery will occur, lose the opportunity of early repair if recovery should fail to take place. In the absence of any evidence of recovery the nerve should be explored within three months of injury. The appearance and feel of the nerve and its ability to transmit a weak faradic current on direct stimulation are of assistance in determining the extent of intraneural damage. In the absence of definite evidence of gross injury the nerve should be freed from any adhesions, protected from scar, and then left alone, as a surprising degree of spontaneous recovery may take place (Livingston *et al.*, 1945). A negative response to faradism when tested through the intact skin is unreliable. Learmonth (1944) finds that the study of the curves of muscle excitability is of assistance in doubtful cases (Ritchie, 1944; Hoen, 1946). In partial wedge-shaped injury to a nerve, or in excision of a neuroma in continuity, great care must be taken to preserve any remaining conducting nerve bundles which give a response, the divided fascicles being adequately resected and then sutured end-to-end, after the intact portion has been mobilized sufficiently to enable them to be brought together without tension.

The prognosis is particularly bad in ulnar nerve lesions. Elkington (1944) found that this was equally true whether the lesion was near the wrist or high in the forearm, in apparent contradiction to the general rule that a lesion is more serious the higher it is situated in a nerve, because of the longer time required for regeneration after repair. One factor may be that the intrinsic muscles of the hand act as opponents to the long flexor muscles as they extend the fingers at their interphalangeal joints, through their insertions into the extensor tendon expansions.

When division of the ulnar nerve, and particularly of both the ulnar and median nerves, is done below the level of supply to the long flexors a marked degree of clawing of the fingers is produced by the then unopposed action of the long flexor muscles, whereas, though the long flexors are also paralysed in high lesions, this troublesome dissociation clawing does not occur. Seddon makes the helpful practical suggestion that the poor results after injuries of the ulnar and median

nerves at the wrist might in part be explained by the fact that after repair the hand is kept flexed at the wrist to relax the suture line, which may be damaged during subsequent correction of the position. It is his practice to mobilize the nerve, if need be up to the elbow, so that it could be sutured with the elbow flexed to 90° and the wrist in the neutral position or even in slight extension.

Nerve Grafting

We have seen that end-to-end suture must be without tension, and when there is any considerable gap following the injury or resection of the nerve ends many ingenious procedures have been practised to enable the ends to be brought together. Mobilization of the segments by blunt dissection, transplantation of the ulnar nerve to the front of the elbow, re-routing the radial to the antero-medial side of the humerus, and, when associated with a compound fracture, resection of as much as 3 in. (7.5 cm.) of the shaft of the humerus have all been practised with more or less success. When a gap between the ends of a nerve cannot be closed by any of these length-gaining procedures the prognosis is exceedingly bad, as there is at present no satisfactory way of dealing with this condition, in spite of the fact that both scientists and surgeons have worked at the problem for many years. All the devices to provide a sleeve or scaffolding which would fill the gap and guide regenerating nerve fibrils into the distal stump have so far proved unsuccessful.

Homografts.—The use of nerve homografts—grafts transplanted from an individual of the same species—has yielded results which are difficult to interpret, as the regenerating fibrils grow down for varying distances into the graft and then fail to progress. Seddon and Holmes (1944) suggest that the homograft sets up an active immune reaction, such as Medawar (1945) found to be responsible for the destruction of skin homografts, preceded by a latent period during which their behaviour resembles that of an autograft. During the latent period the nerve fibres begin to colonize the graft, and in a short homograft in animal experiments may even succeed in traversing the graft before the specific immunity reaction sets in and arrests further progress, if it catches them still in the graft. Further complete failure with homografts has recently been reported by Barnes *et al.* (1946) in 8 cases. The use of stored grafts to avoid this immune reaction has proved equally unsuccessful, as they were found to provoke a foreign-body reaction which led to their removal by phagocytosis.

Autografts.—The results following the use of autografts have been more encouraging, as, though the graft dies, it preserves its original neurilemma structure, and neurotization of the autograft is predominantly regular and parallel to the graft structure, while in homografts the regenerating fibres follow an irregular and deviating course (Loyal Davis *et al.*, 1945). Autografts of sufficient size are, however, seldom obtainable in human surgery.

I have already referred to Duel's successful use of degenerated grafts. The method he employed was to cut the anterior femoral cutaneous nerve proximally and distally, and then to leave it otherwise undisturbed in place for two or three weeks to allow degeneration and enough absorption to take place before using it as a graft. Duel (1934) states that when portions of the nerves treated in this manner were used to graft defects in the facial nerve, facial response was restored in a quarter to half the time formerly required for fresh grafts. Lathrop (1946) used Duel's technique with success in 9 cases to repair lesions of the facial nerve secondary to war wounds. He employed fresh grafts of the anterior femoral cutaneous nerve in 5 and predegenerated grafts in 4 cases, and reports that the only advantage of the latter was that it was more easily handled because "its increased consistency permitted better coaptation of the suture lines"; but the rate of recovery of function was not hastened.

Bunnell (1944), utilizing the sural cutaneous nerve from the back of the calf as a fresh cable autograft, records very successful results. A bundle of short lengths of a size to match the injured nerve was used. This method has not proved so successful in other hands. Loyal Davis found that "even in the cat autogenous grafts did not heal like an end-to-end suture. The ectodermal elements of the graft underwent a necrobiotic process, and only the mesodermal elements remained alive. The myelin degeneration process was different from Wallerian degeneration. It also seemed that the Schwann cells in the graft became necrotic, possibly as a result of ischaemia. The mesodermal endoneural cells, however, usually survived and were an important factor in the preservation of the original structure of the graft. They proliferated almost immediately after implantation of the graft, and thus paved the way for the regenerating nerve fibres which, accompanied by outgrowing Schwann cells, followed the old endoneural tubes."

Necrosis is most marked in the central portions of a large autograft, and regenerating nerve fibres to a great extent occupy the peripheral zones of the graft. Bunnell considers that this is due to the surrounding lymph having penetrated the periphery to maintain its vitality, and he believes that the success of the multiple-stranded autograft is due to the fact that lymph is able to penetrate more easily throughout its looser structure. Gutmann and Sanders (1943), however, suggest that the endoneural tubes may be too narrow to allow the effective maturation of large motor fibres, and consider that this may explain some cases of failure of cable grafts of cutaneous nerves for gaps in the larger peripheral nerves, though they may succeed, as Bunnell has found, in repair of smaller sensory nerves and for certain special nerves such as the facial.

Tendon Transplantation.—In the present state of our knowledge, however, the chances of success after grafting are so poor that, in addition to the use of an autograft, tendon transplantation should be resorted to without delay. There seems little justification for Iselin's (1945) arguments in favour of tendon transplantation as a routine measure even when end-to-end suture has been possible. He advises early muscle transplantation in all cases of division of the larger peripheral nerves before muscle atrophy, joint stiffness, and other trophic changes have had time to develop and to curtail the period of incapacity. He considers that the present practice of resorting to orthopaedic measures only after nerve repair has failed has little chance of success, because too much is required of the transplanted muscles, which, though weakened and acting at considerable disadvantage in their new positions, are expected not only to correct deformity but also to furnish movement. He urges, along the same lines as Bunnell, that the *static* deformity must first be corrected by tenodeses and other orthopaedic methods before the muscles are transplanted to restore *mobility*. Iselin believes that, even in the event of nerve repair ultimately proving successful, this result will be assisted because the transplanted muscles act as tutors while those whose action they have reinforced are regaining their functions.

Iselin's views appear to be supported by Altman and Trott (1946), who performed muscle transplantations in 23 cases of paralysis of the radial nerve, with most successful results, as the function of the hand and wrist approached normal in approximately two to three months after the operation, of which they describe some useful modifications in technique. Tendon transplantations have proved successful and have been widely practised for many years to correct the effects of radial nerve paralysis, and more recently treatment along similar lines has been devised to restore some usefulness to clawed fingers secondary to an irremediable ulnar nerve lesion, and to bring back opposition of the thumb after paralysis of the muscles concerned in that essential movement. Bunnell, in particular, has given a detailed description of this form of treatment.

Conclusion

Throughout all stages of the treatment of peripheral nerve injuries it is of great importance to remember that denervation is associated with trophic changes which affect all the structures of the limb, including the joints; and though splinting is necessary in their treatment and after-treatment to relax the paralysed muscles and to safeguard the nerve repair, the splints must be removed frequently to permit guarded exercises to preserve joint mobility and electrical stimulation of the paralysed muscles, as the one and only criterion of success is restoration of function, which is so quickly lost and so difficult to regain.

Summary

The reasons are given why delayed secondary suture of peripheral nerve lesions is likely to prove unsuccessful.

The preliminary results of surgical treatment during the second world war, which are now becoming available, furnish strong evidence in favour of early secondary as opposed to primary nerve suture.

Recent work on nerve grafts is considered.

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ACUTE APPENDICITIS IN THE AGED

BY

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Relatively little has been written about this ubiquitous disease in the aged, yet its manifestations are often so different in patients over 60 that a description is merited. The following points are stressed: (1) The incidence, and the advanced age at which it may occur. (2) The differences in the symptom-complex, and the importance of bearing them in mind. (3) The difficulties in diagnosis and treatment. At any age surgical intervention is well worth while.

Pathology

In acute appendicitis 1 to 2% of all cases occur in patients who are over 60 years of age (Taylor, 1935; Maylard, 1920). The aetiology of the disease is the same as at other ages, but emphasis must be placed on obstructive factors, especially faecoliths. The structure of the organ has altered by the time 60 years have passed. Most of the lymphoid tissue has disappeared and fibrous atrophic changes have occurred, associated with vascular changes, causing impaired circulation and an inability to respond to the demands of inflammation for increased blood supply. Thus the devitalized organ, when subject to obstruction, rapidly succumbs to the onslaught of the infective contents and soon perforates. The omentum and general peritoneum often lack their pristine ability to localize infection, and general peritonitis results. This is withstood poorly, and a fatal termination is common.

The following summary of different series clearly demonstrates the prevalence of serious pathological changes:

	Stalker	Wood
Appendix ruptured	62%	80%
Appendix not ruptured	38%	20%

These figures show that in over two-thirds of the cases the appendix is ruptured.

The mortality is variously reported: Stalker (1940), 16%; Taylor (1935), 20%; Wood (1934), 28%; Fitch (1928), 54%. The commonest causes of death are general peritonitis and pneumonia, while pulmonary embolism, cardiovascular accidents, cardiac failure, septicaemia, and intestinal obstruction account for a small number. Thus acute appendicitis in the aged rapidly passes to a state of gangrene, followed by perforation and often by general peritonitis, when the localizing powers are too slow or ineffective to allow of abscess formation.

Clinical Aspects

The symptoms and signs differ considerably from the usual pattern in younger patients, but nevertheless there is a fairly well defined syndrome in the aged. Pain is often poorly localized, though nearly always present, and becomes intense only when peritonitis has supervened. In the early stages it is frequently attributed to constipation, which often accompanies or precedes the attack. The taking of aperients, no doubt, adversely affects the issue.

The general reactions of nausea, vomiting, fever, and elevated pulse rate are not found, though a slight fever is recorded in some cases, especially when general peritonitis has supervened. The localizing signs of rigidity, tenderness, and pain on rectal examination are vague and inconclusive, or are absent. Thus in the early stages the patient does not appear ill and shows no signs of the mischief afoot, so that even the wary may be deceived into thinking that constipation is the only complaint. The patient frequently considers this to be the trouble and delays seeking advice. Hence many cases are not seen until peritonitis has developed.

The clinical picture is now dominated by pain and distension, while vomiting and fever are common. Intestinal obstruction is often suspected by the medical attendant, and valuable time may be lost in attempts to locate a growth. When a mass is present this diagnosis receives strong support. (In Wood's series 38% were misdiagnosed before operation as carcinoma or obstruction of the bowel.) Assistance in diagnosis will be found in a white cell count, which is often significantly elevated even in the aged, but it will greatly help if it be remembered that 1 to 2% of all cases of acute appendicitis are found among those over 60.

Treatment

It is manifest that ideals in treatment are difficult to attain when the surgeon is in doubt as to the nature of the condition before operation. If there is a confident diagnosis, a muscle-cutting incision exposing the lateral side of the caecum permits the removal of the appendix with a minimum of interference with the peritoneal cavity. Those cases showing satisfactory ability to localize the condition—i.e., "appendix mass."—are best treated conservatively, provided the symptoms subside under conditions of rest. Close observation in hospital is, of course, essential.

When appendicitis is considered possible, but there is some doubt as to the diagnosis (38% of cases according to Wood) an incision over the right iliac fossa should be made rather than a near midline laparotomy. If the appendix proves innocent, the operation can be concluded promptly by a caecostomy for relief of large-bowel obstruction. Rarely will it be necessary to close the original incision and make a near midline one in search of small-bowel obstruction.

If there is no suspicion of the appendix before operation and a near midline laparotomy has been performed, appendicectomy should be done only when the surgeon is confident of an easy, speedy removal, with a minimum of manipulation of the intestines—e.g., pelvic or ileac position of the appendix and no adhesions. When the general condition is far from satisfactory a drain down to the appendix is wiser. Taylor, in 1935, strongly advocated drainage in *all* cases, and particularly stressed the dangers of appendicectomy through a near midline incision.

The following case well illustrates most of the above remarks and it is recorded to emphasize the advanced age at which the condition may be successfully treated.

Case Report

A woman aged 85 was admitted to Kingston County Hospital from a pensioners' home on Aug. 8, 1946. She had been constipated for several days, but made no other complaint until a sudden attack of vomiting the previous evening. Two enemas that night produced neither flatus nor faeces. She continued to vomit greenish-brown offensive fluid, and complained of some vague abdominal pain.

On examination the old lady was very thin and dehydrated, with a dry coated tongue and distended abdomen, especially centrally. She tended to hold the abdomen tight and resented palpation, but no localized pain or mass was detected. Auscultation of the abdomen was inconclusive. Rectal examination was negative, and no herniae were present. All other systems were normal. The temperature was 99.6° F. (37.55° C.), pulse 86, respirations 22. A provisional diagnosis of acute intestinal obstruction was made, and the stomach emptied by a Ryle tube, while an intravenous infusion of saline and plasma was administered. Two further enemas failed to produce a result, and a laparotomy under thiopentone-cyclopropane anaesthesia was made a few hours after admission. A lower right paramedian incision revealed free foul pus in the peritoneum and a sticky exudate covering acutely inflamed dilated loops of bowel. The caecum was collapsed, and a perforated gangrenous appendix was lying in the ileac position, free from adhesions. The appendix was easily delivered and removed. The peritoneum was drained and the abdomen closed.

Post-operative treatment, including intravenous glucose-saline, with sulphadiazine 1 g. 4-hourly and 15,000 units of penicillin 3-hourly, brought about steady improvement, and the patient was discharged to the pensioners' home on the sixteenth day of the illness.

Discussion

Early symptoms were not noticed by the patient, and only when vomiting occurred (due to established peritonitis) was advice sought. The clinical picture strongly suggested intestinal obstruction, which no doubt was present in the nature of an ileus, but the cause was not diagnosed until the abdomen was opened. A white cell count before operation might have aroused sufficient suspicion of acute appendicitis to cause the preferable method of right iliac incision to be used. The remarkably uneventful recovery indicates that even advanced age should not deter the surgeon.

Summary

An account of acute appendicitis in the aged is given. The incidence is 1–2% of all cases of acute appendicitis, and the mortality is about 25–30%.

The pathology is a rapid development of gangrene, perforation, and peritonitis.

Clinical aspects are discussed, stressing the paucity of symptoms and signs in the first few days, and the similarity to acute intestinal obstruction and growth of the bowel in later cases.

The treatment is discussed (1) when there is a confident preoperative diagnosis; (2) when acute appendicitis is merely suspected; and (3) when acute appendicitis is not diagnosed before operation.

An illustrative case at the advanced age of 85, with survival, is reported.

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The Medical Officer of Health of Willesden, Dr. G. F. Buchan, has presented an interesting review of his 34 years' period of office with that borough. From the days when he toured his district in a horse-drawn carriage ("thereby adding greatly to the enjoyment of life and work") to the present time, every year has seen the extension, and sometimes the pioneering, of public health facilities. Comparing the five years 1907–11 with 1941–5, the death rate fell from 11.1 to 8.3, the infantile mortality rate from 100 to 50, and the maternal mortality rate from 3.8 to 1.7. A ringworm clinic was opened in 1912 and has greatly reduced the incidence of that disease; an eye clinic followed in 1914. Already in that year the falling birth rate was being critically examined from physical, social, and economic aspects. In 1917 a midwife and home-help service began for necessitous mothers confined at home. A scholarship scheme for training sanitary inspectors, the first of its kind, which was started in 1927, is very successful and has been copied by other local authorities. Of the three health centres the first was opened in 1916, the second in 1918, and the third in 1930, attendances rising from 18,089 in 1917 to 255,962 in 1938. Plans for the extension of the health services have been worked out, but they are necessarily tentative because of the priority of housing.

Medical Memoranda

New Albumin Blood Substitutes

Known blood substitutes (salts) do not yield good results when the patient has lost large quantities of blood or is in a condition of traumatic shock. It has long been considered necessary to add a colloidal component to the salt solution of every blood or plasma substitute to give it body when injected into the blood vessels. The manufacture of artificial colloidal media as substitutes for blood is still an urgent problem. The selection is limited by the presence of foreign albumins which are biologically active; the colloidal-albumin component of the blood substitute should therefore possess no anaphylactogenic or primary toxic properties.

In our work at the Blood Transfusion Institute we have made use of a solution for intravenous transfusion which we called "colloidal infusin"; it contains an albumin product obtained from the casein of cows' milk. Casein, of course, has both anaphylactogenic and toxic properties. We set about preparing an albumin product from casein which did not possess these properties and which could be used for internal injection in large quantities. A system of fractionation of natural casein was developed to remove the substances possessing primary toxic and anaphylactogenic properties. Practically, this consists in a special method of denaturization and a weak hydrolysis of the initial natural albumin with extraction by means of an organic diluent.

Experimental

Before recommending colloidal infusin to the clinics as a therapeutic medium for parenteral infusion and injections we studied it on animals. Experiments on the substitution and stimulation aspects of the solution were developed in accordance with the following plan: (1) Biological test for anaphylactogenic and primary toxic properties. (2) Substitution effect on dogs whose blood had been drained in quantities sufficient to cause death. (3) A study of the dynamics of the serum albumins in patients suffering from alimentary dystrophy and treated with frequent injections of colloidal infusin. (4) The effect of non-anaphylactogenic casein on the permeability of the blood vessels in patients suffering from alimentary dystrophy and in experimental animals.

Numerous experiments on rabbits showed the complete absence of toxic properties in colloidal infusin (4% concentration) after a single injection of a large quantity (up to 2 g. per kg. weight with internal application). Subsequent internal injections of this albumin at optimum times for anaphylaxis did not produce any reactive effect in the rabbits. The testing of the solution on guinea-pigs by the classic method of producing anaphylaxis also gave negative results.

Clinical Application

To-day we have behind us the experience of 700 clinical transfusions of colloidal infusin given to patients suffering from various ailments (burns, volvulus, alimentary dystrophy, etc.). In many cases a second injection was given at a period dangerous for anaphylaxis, and no reactions were noted which in any way resembled a state of allergy (rash, Quincke's oedema, and other symptoms).

By using numerous successive injections of colloidal infusin we were able to obtain a rapid increase in the amount of albumin in the serum of patients suffering from alimentary dystrophy, with a corresponding increase in colloidosmotic pressure. The data obtained in experiments on animals and in the treatment of human beings demonstrate the significance of colloidal infusin in combating hypoproteinaemia in various diseases.

We now have considerable data, both clinical and experimental, on the question of the effect of colloidal infusin on the permeability of the epithelium of the capillaries of the patient. The question of the permeability of the capillaries is an important pathogenic factor in the development of many diseases. As a rule an injection of colloidal infusin noticeably lowers the permeability of the capillaries, with a pathogenic increase in permeability during the first hours after the injection. Lower capillary permeability was expressed by a lowering of the liquid filtration figure and—a most important fact—by a cessation in the pathological filtration of albumin.

Colloidal infusin is now used clinically in the following ways: as a plasma substitute in cases of traumatic shock and as a complete blood substitute in cases where there has been considerable loss of blood; as a means of treating hypoproteinaemia of various origins (exhaustion from wounds, deficiency of food,

etc.); and as a stimulant in all cases of indolent wounds. In the surgical and therapeutical clinics of the Academy Profs. H. H. Vlados and V. I. Kazansky have made over 700 injections of colloidal infusin. Patients have proved able to withstand large doses of the solution, and its value as a substitute and a stimulant has been proved.

Prof. N. A. FEDOROV, M.D.,
Director of Experimental Laboratory,
Blood Transfusion Institute,
Academy of Medical Sciences, U.S.S.R.

Monovular Twins

I would like to place on record the following case of twin labour which occurred at the Bosworth Park Infirmary, Market Bosworth, and which appears to confute the theory of X and Y chromosomes.

CASE REPORT

In a primipara aged 31 a twin pregnancy was diagnosed antenatally. This was confirmed some three weeks before parturition by an *x*-ray photograph, which showed a vertex and a breech presenting. A week later the breech of the larger foetus seemed to be in front of the vertex of the smaller; so by simple external manipulation the latter was made to engage in the pelvic brim.

At the commencement of labour the diagnosis of vertex and breech was confirmed, and the vertex was found to be leading. Labour proceeded normally and expeditiously up to the birth of the first twin, a girl who weighed 5 lb. 2 oz. (2.3 kg.); the placenta, however, remained *in situ*, and its normal delivery was prevented by the head of the second twin following on the heels of the first, so that the second head engaged in the pelvic brim, and the presenting part became the vertex instead of the breech. The birth of the second child was complicated by the presence of the umbilical cord of the first, which latter was no doubt responsible for the imperfect flexion of the head, which resulted in a deep transverse arrest. With the aid of forceps the second twin, a boy of 6 lb. 12 oz. (3.06 kg.), was delivered 2 hrs. 20 mins. after the first.

The after-birth came away naturally after the second twin was born, and consisted of a single bag of membranes containing two placentae. There was no visible communication between the two placentae, nor was there any evidence, either macroscopically or by palpation, of the remains of an atrophied partition of membranes, which would have indicated the fusion of two gestation sacs into one. Mother and children are all doing well.

I am indebted to Dr. G. D. Kelly for permission to publish this case.

G. H. PICKERING, M.R.C.S., L.R.C.P.

Oedema of Vulva due to Toxaemia of Pregnancy

The following case of vulval oedema obstructing normal delivery may be thought interesting enough to be put on record.

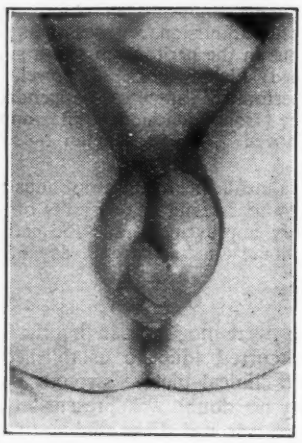
CASE REPORT

Mrs. B., a primigravida of 21 years, attended the antenatal clinic at this hospital throughout her pregnancy. She had no history of any cardiovascular or renal disease, and these systems were normal on examination. Her last menses started on June 19, 1945, the expected date of delivery therefore being March 26, 1946. At first examination she appeared healthy, her blood pressure being 110/55 mm. Hg. There was no oedema or albuminuria. Her pregnancy was uneventful until Feb. 15, when she complained of some swelling of her ankles. A fortnight later, at the 36th week of pregnancy, her B.P. was 150/95. On March 14, the 38th week, her B.P. was 150/105, and there was considerable albuminuria (++), together with gross pitting oedema of legs and thighs, stretching up on to the anterior abdominal wall. Her face looked puffy and oedematous, but there was no oedema of her hands. She had vomited once during the previous night, but was free from visual symptoms and headaches.

On examination on admission there was also considerable pitting oedema of the vulva as well as of the legs and abdomen. The B.P. was 150/110, and there was considerable albuminuria—5 parts per 1,000. In spite of routine treatment, including fluid restriction, salt-free low-protein diet, and 3 mg. vitamin B_1 three times a day, the oedema did not decrease. The following day oedema of the vulva was greater but that of the legs was less. The labia majora and minora were grossly enlarged, as can be seen in the accompanying photograph. Her urine contained 6 parts of albumin per 1,000, and her B.P. was 140/110.

By March 16 no improvement in her condition had occurred; her B.P. was 140/100, albuminuria 5½ parts per 1,000, and oedema greater still. Urinary output was persistently normal and satisfactory. Caesarean section was therefore performed, the indications being a severe pre-eclamptic toxaemia not responding to treatment, with gross oedema of vulva sufficient to obstruct any attempt at a normal delivery. The classical upper-segment operation was performed, because of the impossibility of catheterization of the bladder due to the gross oedema. On opening the peritoneal cavity 1 to 1½ pints (568 to 852 ml.) of pale yellow free fluid was found. This was removed. A normal male child weighing 6 lb. 1 oz. (2.749 kg.) was delivered in good condition, and cried immediately. The mother's condition at the close of the operation was good.

Subsequently her progress was satisfactory. On the third day after operation she developed a temperature. There were no symptoms to account for this, and the oedema prevented a catheter specimen of urine or cervical swab being taken. The pyrexia soon settled with a course of sulphadiazine. The oedema subsided during the course of the next 10 to 14 days, her blood pressure rapidly fell to normal limits, and the albuminuria had disappeared after 10 days. On April 8 she was discharged from hospital in very good health. There was no oedema or albuminuria, and her B.P. was 120/85. The infant weighed 6 lb. 6 oz. (2.89 kg.), was fully breast-fed and



Showing the oedematous vulva, from a photograph taken on March 15, the day before Caesarean section was performed.

in very good condition. The mother was subsequently seen at the postnatal clinic on May 1, 1946, six weeks after delivery, when she was still well, with no trace of oedema or albuminuria. B.P. was 130/70. The child was progressing satisfactorily.

I wish to thank Mr. A. J. Wrigley and Mr. F. H. Finlaison for permission to publish this case, and Mr. M. G. Allen for the photograph.

St. Thomas's Hospital, S.E.1. J. P. BUSH, M.R.C.S., L.R.C.P.,
Resident Obstetric Officer.

Modification of Ochsner and Mahorner Test for Patency of Deep Veins of Calf

It is well established that before an operative cure of varicose veins can be contemplated the patency of the other venous drainage of the leg—that is, the deep system—must be proved. At present there are two standard methods of doing this. The first is that of Ochsner and Mahorner, in which an Esmarch bandage is used to occlude the superficial veins; the onset of pain on walking indicates occlusion of the deep veins. Secondly, that of Delbet and Mocquet, which is based on the anatomical facts that there is free communication between the deep and superficial veins of the calf through the gastrocnemius and soleus and that contraction of those muscles plays a large part in the onward transmission of blood from the leg. When the patient walks with the superficial veins occluded by pressure the collapse of the veins below the pressure signifies patency of the deep veins. The test as decribed in Hamilton Bailey's *Physical Signs in Clinical Surgery* is a combination of the principles underlying these two tests. Both are rather laborious, and the modification to be described, based on these principles, seems to me more convenient and equally effective.

THE TEST

When the incompetence of the saphenous valves has been proved by the presence of a "cough impulse" the thumb or fingers are laid over the great saphenous vein in the thigh with just sufficient pressure to occlude it. The patient is then asked to raise himself up and down on his toes, thus bringing the muscles of the calf into action. He continues to do this until either he complains of pain or the veins below the thumb are definitely seen to be emptying (this usually takes 15 to 30 seconds). The pressure in the thigh is then released, and the veins will be seen to refill rapidly from above. Any doubts as to their having emptied will be dispelled. If this emptying occurs the deep veins may be confidently stated to be patent.

This is a quick and convenient test and is chiefly of value when emptying occurs. If no collapse is seen, although the deep veins may be patent they should be regarded with suspicion. Further inquiry may reveal a history of old thrombophlebitis, which obviously contraindicates ligature.

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Reviews

PROGRESS OF BIOCHEMISTRY

Annual Review of Biochemistry. Volume XV. Editor, J. Murray Luck; Associate Editors, James H. C. Smith and Hubert S. Loring. (Pp. 684. 30s.) California: Stanford University P.O. Annual Reviews Inc. London: H. K. Lewis and Co.

It is difficult to believe that nearly a year has passed since we noted the appearance of Vol. XIV of the *Annual Review of Biochemistry*. Vol. XV is appreciably smaller than its immediate predecessor, consisting of twenty-one special articles by experts instead of the twenty-eight that appeared in the *Review* for 1945. The number of pages has fallen from 772 to 616, with a corresponding reduction in the lengths of author and subject indexes. The present volume has thus returned very nearly to the size of Vol. XII, published in 1943, and has not maintained the increased girth displayed in the two intervening years. These changes in size seem to be largely fortuitous; they are certainly not due to any alteration in lay-out or typography; these are, as hitherto, clear and unpretentious, without unnecessary flourishes, which would be unbecoming in books as severe as *Annual Reviews*. The twenty-nine authors, all different from last year's, are drawn, as were the authors of the previous volumes, mostly from the United States, the home of twenty-one, who are responsible for fourteen of the articles between them. There are three chapters contributed by four Canadian authors, who this year represent the British Dominions in place of three from Australia last year. There are also three chapters contributed from this country, each by a single author, and one from Switzerland. It is a particular pleasure to find a chapter on the chemistry of the steroids by Prof. T. Reichstein and Dr. H. Reich.

The present volume repeats many of the staple features of previous issues; the authors continue to write from laboratories engaged in a great variety of different activities, from research institutions to medical schools and from university departments to industrial laboratories. The book opens with an article on biological oxidations and reductions, which is perhaps an intentional recognition of the fact that animal and vegetable organisms are primarily elaborate contrivances for securing a smooth and continuous maintenance of these particular chemical reactions, with a maximum thermodynamic efficiency and a minimum production of heat sufficient to maintain the organism at the required activity and temperature without damage. This chapter, covered by K. A. C. Elliot, is followed by one on the non-oxidative enzymes by A. M. Wynne; the biochemical ball is thus opened by two Canadians. After an article by S. Peat of Birmingham University, on plant carbohydrates, a subject on which members of Prof. Haworth's school are particularly fitted to write, we return to the usual regular accounts of the chemistry of certain essential nutrients. This year, as before, we have chapters on the chemistry of the lipids (J. B. Brown) and of the proteins and amino-acids (T. L. Meekin and R. C. Warner), as well as articles on the metabolism of carbohydrate (G. F. and G. T. Cori), of fat (W. C. Stadie) and of proteins and amino-acids (D. Rittenberg and D. Shemin). In the last-mentioned chapter reference is made to the very important work of Umbreit and Gale and their respective colleagues, working on opposite sides of the Atlantic, which has resulted in identification of the co-enzyme of tyrosine decarboxylase with pyridoxal phosphate. Thus, another "B vitamin" has been fitted into an enzyme system essential to intermediary metabolism, but this time, unexpectedly enough, the metabolism of protein and not of carbohydrate.

Vitamins, surveyed by R. A. Dutcher and N. B. Guerrant, are this year covered in a long chapter of 74 pages, the water-soluble and fat-soluble vitamins having been hitherto separately treated. Two contiguous articles, one on photosynthesis (C. S. French) and the other on plant respiration (W. C. James), bear witness to the steady maintenance of interest in vegetable biochemistry, as indeed do also four other chapters, though we are sometimes inclined to forget that bacteria and the many problems arising from their symbiotic or parasitic activities are of vegetable origin. These four chapters are concerned with growth factors for micro-organisms (E. E. Snell), the biochemistry of yeast (C. Neuberg), bacterial metabolism (H. A. Barker and M. Doudoroff), and immunochemistry (E. A. Kabat). Perhaps it is not quite fair to place this last chapter under the wing of the plant physiologist and thus remove it from the sphere of influence of the biochemist, who will doubtless also lay claim to the chapters on viruses (N. W. Pirie), chemistry of the hormones (H. Selye and H. Jensen), the biochemistry of teeth (H. M. Leicester) and the steroids, to the last of which reference has already been made.

An account of recent work on pressor amines (W. H. Hartung) strikes a slightly pharmacological note, though it is concerned primarily with the inactivation and detoxication of these substances. The contribution on organic insecticides (W. M. Hoskins and R. Craig) deals with matters of the most far-flung importance in medicine, as well as being highly topical, because of the bearing of insect control on the epidemiology of disease, more especially in wartime and in hot climates.

It will be seen that the 1946 *Review* maintains the catholicity of interest and the high standard of expert knowledge, as witnessed by the names of the authors, that have characterized previous volumes; yet one is left with a slight sense of misgiving. We have the *Annual Reviews of Physiology* as well, to say nothing of surveys of enzymology and chemistry, both pure and applied, some, like this one, from the United States, others from Britain, and some in competition from both sides of the Atlantic. In addition, there are such admirable surveys, periodical but not necessarily strictly annual, as *Vitamins and Hormones*, now in its third number, and one cannot help wondering whether some kind of survey of surveys might not help to reduce their number and thereby also the labour of those who wish to keep up to date as well as of those who are trying to help them to do so.

A. L. B.

OPHTHALMIC SURGERY

Eye Surgery. By H. B. Stallard, M.D., F.R.C.S. (Pp. 444; 338 illustrations. 50s.) Bristol: John Wright and Sons, Ltd. 1946.

It is some thirty-five years since a book on the surgery of the eye has appeared in this country. Mr. H. B. Stallard's substantial volume entitled *Eye Surgery* is therefore welcome. His contribution, as he explains, was written at sea, in military transports, and in camps, amidst many and various distractions, and without any access to ophthalmic literature. This makes it essentially a record of personal methods and experience, but it is none the less a trustworthy guide to current practice. Much that is obsolete (and which finds a place in books produced under more leisurely conditions) is mercifully absent. Inevitably, however, experiences with war casualties tend to colour the writing. Many of the 338 illustrations have been drawn by the author, and this again lends strength to the text, as professional artists cannot illustrate the text so pertinently as the surgeon himself if he has the skill to do so.

The introductory chapter, with its stress on detail, beginning with the personal qualities of the surgeon and ending with the dressings, is characteristic of the book as a whole. A short chapter on anaesthesia and analgesia is followed by an extensive account of the eyelids and reconstructive surgery. This occupies almost a third of the text on operations, and it is here that the effect of the author's experiences during the war are seen at their fullest. The chapter on the lacrimal apparatus contains many personal departures from the standard operations, which, however, are not overlooked. The chapters on the extraocular muscles, on the conjunctiva, cornea, anterior chamber, and sclera are more orthodox in scope, and this also largely applies to the chapters on the iris, the lens, glaucoma, and the retina, choroid, and vitreous. The two concluding chapters deal with traumatic surgery, civil and military, and with the orbit.

Attention to minutiae is the essence of competent operating, and the author's stress on detail makes his text valuable not only for the learner but for the accomplished practitioner. There is much with which individual surgeons will disagree, but the practice of eye surgery as expounded in this book is consistent. Learners will be grateful for the clear indications given on operations for cataract, and few surgeons will quarrel with Mr. Stallard's advice—contrary to textbook teaching—that in the occasional event of the knife being entered with the cutting edge downwards the operation should be postponed, and not

continued at the risk of mutilating the iris. Whether one needle bent at an angle should be used in operations with two needles seems a moot point. Most surgeons prefer to avoid angled instruments, since direction is less certain than with straight instruments.

In post-operative complications in glaucoma delayed reformation of the anterior chamber is undoubtedly a serious matter, but few surgeons will subscribe to the rather pessimistic view taken by the author, which is almost reminiscent of the conception of "aqueous calamity" of the ancient writers. The author likewise probably takes an extreme view in believing that malignant melanomata of the choroid are not so radiosensitive as glioma of the retina. Many pathologists regard melanomata as particularly susceptible to radiation, and believe that the evil repute of the melanomata is due to the early metastases that they give. Few surgeons who have tried it will agree than a Krönlein operation is particularly valuable for the removal of retro-ocular new formations. It is, however, easy to find points from which to dissent in an exhaustive practical treatise. The more significant thing is that here is an adequate text on contemporary operative technique.

PARATUBERCLE BACILLI

Inventaire et Description des Bacilles Paratuberculeux. By Paul Hauduroy. (Pp. 168. 200 francs.) Paris: Masson et Cie. 1946.

If the painstaking collection and recapitulation of facts without any attempt to draw conclusions from them is a worthy scientific purpose, then Prof. Hauduroy may well be congratulated. In his monograph entitled "An Inventory and Description of the Paratubercle Bacilli" he has copied, mainly from the papers of the original authors, a description of no fewer than 160 members of this group. He has wisely refrained from committing himself to any classification of these organisms, realizing that the criteria necessary for such a purpose are still far from clear. He has contented himself rather with defining a problem, and has left it to others to seek its solution. He is plainly intrigued with the potential pathogenicity to laboratory animals of a few strains of paratubercle bacilli; and he has included a chapter on the properties of the tuberculin-like substances, or paratuberculins, that these organisms may produce. The work is for a limited public, intended purely for reference purposes, and will necessarily find a place in the libraries of those whose interest is in systematic bacteriology.

SOME CONTRASTS AND COMPARISONS

Doctors Differ. Five Studies in Contrast: John Elliotson, Hugh Owen Thomas, James Mackenzie, William Macewen, R. W. Philip. By Harley Williams. (Pp. 249; illustrated. 12s. 6d.) London: Jonathan Cape. 1946.

Here is a new and fascinating approach to modern British medical history. The theme of the book is that "the way to make progress in medicine lies through different temperaments." This method is fully justified in the vivid accounts Dr. Harley Williams gives of men opposed in temperament but complementary in achievement who were responsible for some of our most important advances. The first section is concerned with the tentative efforts towards a medical psychology in which such men as Mesmer, Charcot, Freud, and Coué were engaged. Elliotson of University College Hospital is singled out as the pioneer here. His was a brilliant and erratic career well described with incidental sketches of the men with whom he came into contact and generally into conflict. U.C.H. men will be astonished but diverted to read of the strange doings there in its early days, when more or less public séances took place, conducted by Elliotson assisted by two "magnetic" sisters. Wakley of the *Lancet* comes prominently into the picture, first as a stout supporter of Elliotson the innovator, but later a bitter opponent of a "charlatan and exhibitionist." Dr. Williams shows that Elliotson was a real pioneer with the curiosity and perseverance of the scientist, but he was diverted from the track which might have led to a substantial advance in psychology by his belief in an actual fluid magnetism which operated directly or indirectly on certain sensitive people. But there was much that was admirable in Elliotson, and we are reminded that Thackeray dedicated to him the second volume of *Pendennis*.

In the section "Rural Healers" the story of the evolution of orthopaedics from bonesetting is told, illustrated by the personalities of the Thomas family—Evan, the village bone-setter; H. O. Thomas, his son and the uncle and master of Robert Jones. We have H. O., the fiercely independent and quarrelsome craftsman, and Jones who made friends wherever he went. There are also thumbnail sketches of Hutton, the bonesetter, and Wharton Hood, who sat at his feet.

The next contrasted pair are Osler and James Mackenzie who were "largely responsible for the great revival of internal medicine, as much a feature of the 20th century as was surgery in the 19th." The two very dissimilar characters are very well done. Then come Macewen and Victor Horsley mainly in connexion with brain surgery. The reviewer found this section particularly attractive, having known and reverenced both men and most of those mentioned by the way. The two chief actors are described at length with obvious relish: Macewen the self-sufficient—"I am not a co-operator"—who acknowledged no master save Lister, to whom he had acted as house-surgeon; Horsley who "worked gregariously and loved to exchange ideas." The nature of the work of these men is shown as complementary, and justice is done to the genius of both except in one particular. Horsley in his latter days developed a strong interest in politics of an advanced kind. He was adopted as Liberal candidate for Parliament, but quarrelled with his supporters and resigned. The author says, "Few men aroused more antagonism for their theories of life and more love for their personal qualities." Casting his mind back, the reviewer does not think that love was the sentiment aroused by Horsley—rather admiration and respect. And Dr. Williams does him less than justice when he says he was a "failure as a politician" for he overlooks Horsley's great achievement as a medical statesman more responsible than any other individual for the revolution in the constitution of the B.M.A. which transformed it into a vigorous democratic body with a constitution of which Horsley was the main inspiration. This section has well-timed references to Hughlings Jackson, "the philosopher of the nervous system," and to Rickman Godlee, who was the first to operate on a brain tumour.

The final section is devoted to the fight against tuberculosis, the leading and contrasted figures being Robert Philip of Edinburgh and Trudeau of the U.S.A. Why and how these men dedicated their lives to preventive medicine with special reference to tuberculosis is told with gusto and with a spice of salt malice in regard to Philip which will be greatly enjoyed by those who knew him.

In offering thanks for a very interesting book a special word of praise is due to the illustrations—mostly portraits. That of Philip is literally lifelike. The reviewer wishes, however, that the portrait of Macewen could have shown him as the commanding and handsome figure he was in his old age—for Macewen can be said to have had an old age.

A. C.

Notes on Books

The Ministry of Health has published a pamphlet *You and Your Children* (H.M. Stationery Office; 6d.) reproducing B.B.C. talks by a woman medical psychologist (Dr. Doris Odlum). These give simple hints on the handling of normal children—their fears, fads and fancies—and the problems that arise in every family.

A full account of the Royal Cancer Hospital mechanically sorted punched card index system has been compiled by Dr. D. W. Smithers, Mr. K. M. H. Branson, and Dr. H. O. Hartley. Applications for copies should be made to the Secretary of the Royal Cancer Hospital, Fulham Road, London, S.W.3.

A volume of 126 pages, *The League Hands Over*, has been issued from Geneva and is obtainable in London from Allen and Unwin Ltd., at 2s. The last Assembly of the League of Nations has met and has been dissolved and this little book is meant to illustrate why and how the work goes on. It records briefly what the League did during the war and gives extracts of the speeches delivered during the 21st session held in April, 1946.

The Commonwealth Fund of New York has issued a booklet entitled *Eight Years of Public Health Work*, by Dr. HARRY E. HANDLEY and Miss CAROLINA R. RANDOLPH. The area covered in this report is that of Jones County, Mississippi, and the period is 1937–44. The topics considered include sanitation of the community, the child under school age, the school child, the health of the adult, and collection and tabulation of vital statistics. The London publisher is Geoffrey Cumberlege and the price is 3s. 6d.

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NEONATAL DIARRHOEA

The publicity which the outbreak of diarrhoea in the maternity department of the Leicester City General Hospital has received in the lay Press again focuses attention on a problem to which we have referred from time to time.[1] Enteritis in infancy is nowadays divided into neonatal diarrhoea, sometimes called epidemic diarrhoea of the newborn, and the gastro-enteritis of older infants. Outbreaks of diarrhoea in the nurseries attached to maternity units have been frequent in the large cities of America, and particularly in New York, but have rarely been encountered in this country, though medical officers of health and bacteriologists have been specially requested to report any such incidents.[2] There may be a certain hesitancy in reporting trouble in maternity units just now on account of the great shortage of beds and the natural unwillingness to attract attention to a condition which may necessitate closing down the unit for a period. But primary neonatal diarrhoea is a highly fatal infection, and infantile deaths do result from it. However, the mortality rates in the neonatal period have shown a marked decline during the past five or six years, and it is therefore unlikely that this serious infection has hitherto been common in this country. Incidentally, there is no indication that it is associated in any way with malnutrition.

The problem, however, has been complicated during the past few years by the occurrence among adults of a non-bacterial infectious enteritis which has been particularly prevalent in maternity departments. A typical example was reported in this *Journal* by Brown, Crawford, and Stent.[3] The persistence of this infection in maternity units is probably related to the rapid turnover of patients, so that fresh fuel is continually being added to the fire which in consequence keeps smouldering on, flaring up periodically into more serious outbreaks. This infection, characterized by profuse watery diarrhoea of one to four days' duration with slight pyrexia, may affect a high proportion of both mothers and nursing staff, but its incidence among babies is usually much less (around 10%), and as a rule it is a mild infection in the baby, although deaths have occurred, usually in weakly or premature infants. This is the disease which apparently has affected the maternity units where both mothers and nursing staff were being attacked, but the high mortality rate among the infants at Leicester suggests that the infection there may be the true epidemic diarrhoea of the newborn.

The aetiology of the condition is still obscure. Intensive studies on the bacterial flora of affected infants have failed to show the presence of any accepted pathogen, while there is no evidence that the toxins of such bacteria as *Staph. aureus* or *Cl. welchii* play any part in the pathogenesis of the infection.[4] An interesting hypothesis has been put forward by Gale,[5] who found that some strains of *Str. faecalis* actively produced tyramine from tyrosine and that tyramine was toxic to young rats which had not yet developed the specific detoxicating enzyme. Babies in the first few months of life also lack this enzyme, and as active tyramine-producing strains of *Str. faecalis* have been found in the stools of babies with neonatal diarrhoea it was suggested that these organisms might be causally related to the condition. That *Bact. coli* and other Gram-negative bacilli may also be involved is suggested by the finding of *Ps. pyocyanea* as the predominating organism in an outbreak of neonatal diarrhoea[6] and of *Bact. neapolitanum* in 90% of cases of gastro-enteritis in older infants.[7] Cruickshank[8] has put forward the view that many of the types of diarrhoea seen in infants may be associated with potentially pathogenic variants in the coliform group.

The possibility that a virus may be involved cannot of course be excluded in spite of some negative findings. A few years ago two American workers[9] claimed to have isolated from the stools of cases of neonatal diarrhoea a filtrable agent which produced diarrhoea in inoculated calves. This filtrable agent was unusual in that it resisted heating at 100° C. for five minutes. However, the claims of these workers have not apparently been substantiated. Buddingh and Dodd[10] have described a syndrome of stomatitis and diarrhoea in infants from whose mouth lesions a virus-like agent was isolated, but their syndrome does not correspond with the usual clinical features of neonatal diarrhoea as seen in this country.

While aetiology still remains a mystery, prevention and control of the infection seem to be closely linked with breast-feeding of the infant and a high standard of hygiene in the nursery. The breast-fed baby is not immune to epidemic diarrhoea, but outbreaks are rare and usually mild in character in units where over 90% of the babies are wholly breast-fed, as we understand is the case at both Oxford and Leicester. In one outbreak Ormiston[11] reported a fatality rate of 14% among breast-fed babies and of 60% among artificially fed infants. In another outbreak[6] in a unit where at the time only 12 out of 30 babies were wholly breast-fed these 12 babies alone escaped infection; the remaining 18 all developed diarrhoea and all died. If supplementary feeds have to be used, great care must be taken to see that bottles and teats are washed, and preferably sterilized, immediately *after* the feeds so that bacterial contaminants have no opportunity to grow and to produce toxic substances. One maternity unit has dispensed with feeding-bottles altogether for supplementary feeds or extra fluids and uses the spoon instead. Another common practice of housing all the babies in a communal nursery that is frequently overcrowded might well give way to the more

1 *British Medical Journal*, 1944, **1**, 595; 1945, **2**, 189.
2 *Monthly Bull. Min. Hlth. and E.P.H.L.S.*, July, 1942; June, 1943; Nov., 1946.
3 *British Medical Journal*, 1945, **2**, 524.
4 *Lancet*, 1941, **2**, 590.
5 *British Medical Journal*, 1944, **1**, 631.
6 *Lancet*, 1943, **2**, 758.
7 *J. Path. Bact.*, 1945, **57**, 239.
8 *Arch. Dis. Child.*, 1945, **20**, 145.
9 *Amer. J. Publ. Hlth.*, 1943, **33**, 1451.
10 *J. Pediatr.*, 1944, **25**, 105.
11 *Lancet*, 1941, **2**, 588.

natural arrangement of having mother and baby together, particularly where the maternity department is made up of small, four- or six-bedded units. Premature babies should be kept singly or in pairs in cubicles, for they are particularly susceptible to any kind of infection.

Despite all these precautions it has usually been found that the only procedure which will terminate an outbreak of neonatal diarrhoea is closure of the maternity unit, and it is wise to take this somewhat drastic step early rather than late. Control of the diarrhoea of adults which secondarily affects both breast- and bottle-fed babies presents considerable difficulties. The available evidence indicates—recent Oxford experience is in accord—that the infection is airborne, therefore good ventilation should be maintained at all times, even when the outside temperatures drop to a low level. Again, special care must be taken to protect the premature infant. Closure of the unit will, temporarily at least, cut short an outbreak of this type, but unfortunately the disease is often endemic in the area and may light up again with fresh admissions to the hospital. Treatment of the severe form of neonatal diarrhoea is disappointing. Both good and poor results have been reported with sulphaguanidine and succinylsulphathiazole. Intravenous fluid therapy, using Hartmann's solution plus 5% glucose and half-strength serum or plasma alternately, has proved very valuable in the dehydrated older infant and should be tried more often. It could be used, probably combined with oxygen therapy, even in very young babies. Such treatment requires expert team-work by medical officers and nursing staff, and mobile teams might well be utilized to cope with outbreaks in hospitals where such experienced personnel are not available.

MENTAL HEALTH LAW REFORM IN SCOTLAND

The National Health Service (Scotland) Bill, like the Act for England and Wales, will bring about many changes in the administrative pattern of mental health services. The Bill would make the main mental treatment and mental deficiency services part of the new hospital and specialist arrangements. It would lay a duty on the Secretary of State "to co-ordinate and supervise the administration by education and local health authorities of their powers and duties with regard to defectives." Local health authorities would be responsible for the ascertainment of mental defectives and for the provision of "suitable training or occupation for mental defectives who are under guardianship." The Bill would involve amendments and repeals of varying extent to the Lunacy (Scotland) Acts, 1857 to 1913, and the Mental Deficiency (Scotland) Acts, 1913 and 1940. It would also provide for the statutory disappearance of the word "asylum" and the substitution of "mental hospital." The publication of the Scottish Bill gives a new interest to the report[1] issued a few months ago by a Departmental Committee which was appointed in February, 1938, by Dr. Walter Elliot, then Secretary of State for Scotland. The Committee, with Lord Russell as chairman, was set up to inquire into the law relating to lunacy and mental deficiency and to report what amendments it considered necessary as a preliminary to the consolidation of mental health law in Scotland.

The Committee is not in favour of a special qualification in psychological medicine for medical practitioners signing certificates for the purposes of detention. It suggests rather that the reforms in the training of students advocated by the Goodenough Committee should be carried out so as to ensure that every medical practitioner will in future be adequately equipped to certify under the Lunacy Act. Any qualified medical practitioner on the British *Register*, in the Committee's view, should in law be competent to grant certificates under either the Scottish or the English Lunacy Acts, but if there are in fact any legal or administrative difficulties these should if possible be removed. A specific statutory definition of the word "lunatic" is not desirable, but it is recommended that the terms "lunatic," "insane person," and "person of unsound mind" should be replaced by the term "mental patient." "Idiots" should be transferred from the purview of the Lunacy Acts into that of the Mental Deficiency Acts. The term "mental patient" would apply to any person who on account of mental illness is certified by two medical men to be a person requiring detention for care and treatment. Care and treatment should be the operative words, and so far as possible compulsory detention should be applied only when the patient is unable or unwilling to consent to such care.

The system of voluntary treatment which has been used in Scotland for nearly a century should be continued. On temporary provisions the Committee proposes to follow the English Act of 1930. It also agrees that the reception procedure should be simplified and that opportunities should be provided for early treatment for a limited period, as in the voluntary and temporary provisions of the English Act. Compulsory detention for prolonged treatment should be covered by the authority of a judicial order. Medical certification and the provision of hospital care are entirely medical matters and should be in the hands of some branch of the health department of the local authority. The petition to the sheriff for an order in respect of both lunatics and mental defectives requiring assistance should be presented at the instance of the local authority. In considering a petition for an order under the Lunacy Acts the sheriff should be authorized to proceed on lines somewhat similar to those laid down by English law. The Committee would also apply the English private patient procedure to all patients, and pending the result of inquiries would institute an interim order. The present emergency certificate which is valid for only three days should be valid for seven days, like an English urgency order. The present safeguards against improper detention are thought sufficient.

Senile patients present an increasingly serious problem. The shortage of accommodation for mental patients generally is due to the accumulation of patients who have not recovered and of elderly patients whose mental deterioration has made them too difficult to look after at home. It it suggested that asylum authorities might be empowered, though not required, to make special provision for such patients in a separate section of an institution, or even completely separate provision. Senile patients who do not require prolonged institutional care should not be certified

[1] Cmd. 6834, 1946. Edinburgh: H.M. Stationery Office. Pp. 131. 2s.

but should be provided for along the lines of the English Mental Treatment Act. Persons who are senile but not so mentally ill as to be certifiable form an important group for which some provision may be required to be made by the public health authorities.

The Committee hopes that a special department of the Central Health Authority will deal with all branches of mental health. The General Board should, in its opinion, have power to order the transfer of a mental patient from one place to another when this is necessary or desirable in his interests but the person responsible for his detention does not make the necessary application. The relative position of the Board and the local authorities in the management of district asylums should be clarified. The English procedure by which the visiting committee of a new asylum submit draft rules for its government through the Board should be copied. The Committee would require the consent of the Board or of the Secretary of State to the dismissal of the medical superintendent of an asylum as well as of a certified institution.

Medical superintendents should have power to grant patients leave of absence for short periods at their own discretion, and leave on probation for longer periods with the sanction of the Board, but no person committed as a dangerous lunatic should be liberated temporarily without the sheriff's authority.

Broadly speaking, the Committee would assimilate the Scots law to that of England in regard to voluntary and temporary patients. It stresses the importance of having fully qualified staffs in charge of observation wards attached to general hospitals. It also recommends the creation of one centrally situated institution for Scotland for the reception and treatment of dangerous lunatics. This should be equipped, managed, and financed as part of the State Asylum for the detention of criminal lunatics. The Prisons Division of the Scottish Home Department should cease to have any control over the State Asylum, and full responsibility should be transferred to the General Board of Control. It is hoped that before long criminal and dangerous lunatics will be detained in a suitable building, not just part of a prison, and large enough to keep such patients out of ordinary asylums.

Also urgently needed is a State institution separate from the State Asylum for dangerous or violent mental defectives. In the definition of mental deficiency the Committee approves the English classification, except that they would leave out the class of moral defectives and call the feeble-minded, imbecile, and idiot classes Grades A, B, and C, respectively. Educable children should not be described as mentally defective, and their mental condition should not be classified until the age of 16. The Committee mentions another class of adolescents who display distressing symptoms of unstable disordered behaviour and are regarded as social misfits but whose mental capacity and conduct touch only the fringe of insanity, mental deficiency, or criminality. No suitable treatment appears to exist for this group, and the Committee suggests that the legislature might at the earliest moment devise some provision which will submit such persons to training and supervision in a colony or institution in which medical and psychological treatment will be available.

Local authorities should, in the opinion of the Committee, be compelled to carry out their duty of ascertainment, and should be authorized to deal with mentally defective children under 5, but only with the consent of the parent or guardian. The Committee would discontinue the present arrangement under which children found unsuitable for education in special schools and classes are passed on to the public assistance authority. The duty of providing education and training for all trainable defectives up to 16 should be laid upon the education authorities, who should be obliged to employ a psychiatrist, a psychologist, and at least one psychiatric social worker. It is not recommended that all mental defectives capable of useful training should be under compulsory control and supervision and required to attend at training and educational centres up to the age of 18. Mental defectives capable of remunerative occupation at 16 should be exempt from compulsory attendance. For those not so capable training facilities should be provided as part of the system of education, perhaps under the Disabled Persons (Employment) Act, 1944. The continued care and training of mental defectives over 18 should become the duty of a composite mental health committee, on which the interests of education, public health, and public assistance should be represented.

The Committee recommends the setting up of a central index with notification of ascertained defectives by the education authorities. Information from the index should be available only to local authorities and public prosecutors, who would be obliged to inquire whether the name of any accused person is on the index and, if it is, to see that the court knows of the fact.

Prof. D. K. Henderson, a member of the Committee, made a number of reservations. He thinks that the adoption of the English Mental Treatment Act would unnecessarily complicate the status of the voluntary patient, who at present can be kept in hospital if he loses his volition but who under the English rules would have to be discharged after 28 days. He would go further than the Committee and amend the Mental Treatment Act so that all non-voluntary admissions could have temporary treatment for a year without certification. He is also doubtful about the possibility that the education authority will be given too much responsibility in matters concerning the mental state of defectives, which is a question for the health authority. Supported by Lord Provost John Phin, he suggests that directors of education should continue to supervise all educable defectives between 5 and 18, but that all other children should be under the jurisdiction of the health authority.

A MORAL ISSUE

As might have been expected, the medical profession as a result of the plebiscite has had what is usually described as "a bad Press." The British Medical Association is by now used to having its actions and views widely misinterpreted. There can, for example, be no justification for this accusation of the *Times*: " . . . it is evident that the B.M.A. intends to persist in the rather reckless and emotional agitation which has contributed in no small measure to the outcome of the ballot." The *Times* leader

writer goes on to say of general practitioners: "Yet they do not seem to recognize that no comprehensive medical service can be made to work without a considerable transformation in their personal circumstances, a transformation which by collaboration they could help to plan on constructive lines." On the contrary, it is because practitioners recognize what is euphemistically described as "a considerable transformation" and not because of any "reckless and emotional agitation" that the results of the plebiscite are what they are.

In the face of so much hostility medical men may well have felt discouraged during the past fortnight to find so little sympathy for their case and so little understanding on the part of the Press of the roots of their opposition to Mr. Bevan's Bill. It was therefore heartening to discover in the independent Sunday newspaper, the *Observer*, a leading article which put the case of the medical profession in a way which showed intimate understanding of its real position: "The impression given by many criticisms is that they [the doctors] are a set of old fogeys, blindly obstructing the tide of progress and putting their own interests before the health and social welfare of the nation. This is an unfair picture of the resisters and their motives. They have a case which should be heard. . . . The charge that they are defying Parliament has no legal substance." The article goes on to describe the wide powers of the Minister to make regulations and orders, to explain the reason why medical men so strongly object to the basic salary, and to see in the resistance movement "a conviction that the Act represents the first stage in a Socialist policy which would eventually transform the character of medical practice as a free profession and profoundly injure the personal relationship of doctor and patient." The *Observer's* leader points out that with the present Act a Minister who shared the wish of a strong section of the Labour Party for a whole-time fully salaried service could translate this wish into action without further legislation. A notable contribution to the controversy is concluded by this paragraph:

> Inveterate planners are impatient of principles: having set their heart on a scheme they want above all to make it work. They are more interested in the results expected from it than in the methods employed, however harshly these may bear on human scruples or human relationships. There is no doubt that a National Health Service is greatly needed, and that it could bring great benefits to the community. The resisting doctors recognize this: but the present Act seeks to obtain benefits by methods which they cannot reconcile with their conscience and sense of medical duty. They are standing on a moral issue, and for this they should be given credit, even by their opponents.

In our correspondence columns this week Dr. Alan Maberly writes: "There can be no doubt that this is a moral and ethical issue of the first importance." Other correspondents are just as clear about the principles which have determined the policy of the Association. The doctors who answered "No" in the plebiscite are standing on a moral issue, and for this "they should be given credit."

We fear it will be some time yet before our critics will extend us this credit, but believe that in the course of time they will slowly and reluctantly be compelled to realize the truth of the issue so clearly placed before the general public in the statement quoted from the *Observer*.

TRAVEL AND DISEASE

From the earliest historical times the desire to trade, t dominate, to convert, or to satisfy an idle curiosity h impelled men to travel far and wide over the earth. Besid bearing their culture to distant lands they have also, Dr. Findlay points out in an article on p. 979 of th *Journal*, spread their diseases. Modern transport facilit have enormously increased the likelihood of diseas spreading, and in particular the speed of aeroplanes pe mits not only the transport of an infected passenger another country and his entry into the new society befor the disease becomes apparent, but also the carriage o vectors of certain diseases—vectors that would previousl have perished in the course of slower journeys by ship.

The mosquito-borne diseases yellow fever and malar are particularly dangerous in this respect, but fly-borne i fections may also present a problem, as well as trypan somiasis, dengue, and the insect-transmitted encephalitid Tsetse flies share with man a liking for swiftly movin vehicles, whether train, motor-car, or bicycle, and they ha been reported in aeroplanes. Mosquitoes, too, are n averse from air travel, as Dr. Findlay mentions, and ha survived flights of over 9,000 miles at heights of 10,000 12,000 feet. Traffic on the new motor roads in Africa h been responsible for spreading diseases as diverse gonorrhoea, bilharziasis, and relapsing fever.

The prevention of transport by aeroplane of the insect borne diseases, though a comparatively simple problem, of a greater magnitude than might at first appear. Scheme for keeping aerodromes and their neighbourhood clear the mosquito's breeding-grounds require large staffs if the are to work satisfactorily. A single aerodrome may cove several square miles—a large area to be kept perfectl drained in countries subject to tropical rains—and nearb native villages may require spraying with insecticides an supervision of their wells, drains, tanks, and ponds. Th scrupulous application of insecticides to the interiors o aeroplanes and to the passengers and crew is essential. addition, all travellers must be immunized against yello fever not less than ten days and not more than four year before entering a locality where the disease is endemic.

There can be no doubt that the measures required ca be adequately carried out only by an international organiza tion. Many countries on international air routes—and pe haps particularly those where the insect-borne diseases ar chiefly endemic—have neither the money nor the staff provide adequate control. The wealthy countries are qui as concerned as the poor that the spread of disease shoul be checked, and there is no reason why contributions t this end should not be proportionate to a country's income The World Health Organization of the United Nation would seem to be the most suitable body to undertak this work. The staffs appointed by it would be respon sible to W.H.O. and only secondarily to their ow governments.

A further argument favouring an international attac on the problem is the urgent necessity for preventiv measures. The schemes put into operation during th recent war have in many cases lapsed, particularly i tropical countries. Wind and rain and neglect are com bining to destroy the work built up at such great cost severe damage can overtake a drainage system in a season it is not attended to; mosquitoes return to their old haun to breed as soon as the opportunity occurs. Again, seems that there is not only confusion about the yello fever certificates and who is empowered to sign them, bu black market forgeries are available for those who want t avoid being immunized. This sort of trafficking require international control for its suppression.

HOSPITALS' BALANCE SHEET

The execution morning may not be far distant, but there is nothing of the atmosphere of the condemned cell about the record of the London voluntary hospitals during 1945. The *Statistical Summary*, which King Edward's Hospital Fund presents,[1] is a dry enough compilation, but as with Dr. Johnson's friend, Oliver Edwards, "cheerfulness is always breaking in." It is, of course, true that in 1945 the Government proposals for the future of hospitals had not been promulgated, but the Government came into power in the middle of that year, and its programme could be anticipated. On the other hand, the cessation of war may well have evoked a spirit of thanksgiving which took the form of enlarged gifts to hospitals. However it may be, the subscriptions and donations to 164 voluntary hospitals in London in 1945 reached £1,276,000, being £135,000 more than the year before. Not only so, but in spite of death duties, high taxation, and other adverse economic circumstances, legacies rose to £676,000, an increase of £121,000 on the year. Mr. Bevan, in a recent speech, mentioned a voluntary hospital in his own mining district of South Wales and said that as a miner he paid 4d. a week to the hospital, as did all his fellows, not as a voluntary act, but from the necessities of their occupation, so that in this way the miners contributed 97.5% of the hospital income, and only 2.5% was contributed by the charitable, yet it was the charitable, he added, to whom the vote of thanks was accorded at the annual meeting. No proportion like this holds good in London hospitals. The voluntary gifts, leaving entirely out of account patients' payments, contributory schemes, and the like, account for just over one quarter of the total income. Patients' payments, including patients out and in, pay-bed patients, and patients coming under contributory schemes, account for just under one-third of the income, and the remainder is made up by payments from local authorities and dividends on investments. On the whole, the smaller the hospital the larger the proportion of voluntary contributions. Thus in the twelve hospitals with medical schools the proportion of voluntary gifts is 21.4% of the total income, whereas in the group of the smallest general hospitals, those with 50 or fewer beds, the comparable figure is 31.8%. The highest proportion of voluntary giving is to children's and maternity hospitals, and the lowest to orthopaedic and cancer hospitals.

On the other side of the account, however, hospital maintenance expenditure is steeply rising. The cost of salaries and wages in 1945 was up by a quarter of a million on the figure for 1944; in the teaching hospitals alone it was up by £100,000. This increase is accounted for not only by rising prices, but by increased services, for over 30,000 more in-patients were in the hospitals in 1945 than in 1944, and nearly 200,000 more out-patients were making attendances. Here it is necessary to read between the figures. Increased income is not keeping pace with increased costs. Thus while 68 general hospitals rejoice in a surplus and only 29 show deficits, the total deficit of those 29, £143,000, is more than the total surpluses of the others. Moreover, a number of hospitals show no balance on one side or the other, offsetting an excess of expenditure by transfer from free legacies; and, on the basis of sound hospital finance, these ought also to be ranked as hospitals in deficit.

The *Statistical Summary* gives particulars of the average length of stay of patients in hospital. In the general hospitals the average duration in 1945 was 18.3 days, and in the special hospitals 29.5 days. In the medical school group the average was just over 20 days. The average number of attendances of out-patients in all the general hospitals was 4.8 for each patient. In the teaching hospitals and also in the largest hospitals without medical schools it was just over 5 attendances. In the special hospitals, of course, this figure varies widely according to the condition treated and was highest in the orthopaedic hospitals (13 attendances).

[1] *Statistical Summary of the Income, Expenditure, and Work of 164 London Hospitals for the Year 1945.* King Edward's Hospital Fund for London, 10, Old Jewry, E.C.2. 1s. net, 1s. 6d. post free.

IT CAN HAPPEN HERE

The new "Medicine" is beginning to take shape long before the appointed day provisionally fixed for April, 1948. On Dec. 11 the Council of the B.M.A. declared its opposition to the "closed shop" and is recommending to the Representative Body that "it is undesirable on principle that any practitioner should be required to join any body, B.M.A. or other." But when the Socialist State owns all the hospitals and will, therefore, be the employer of all those working in them, we shall, no doubt, see Willesden repeated on a grand scale. The Willesden incident was bad enough, but what doctors fear more than anything else is interference of the State with the responsibility of the individual doctor for his own patient. There have, of course, been the usual assurances from Government spokesmen that such a thing cannot happen here, but that it can is shown all too plainly in a letter from Dr. H. Foxell, of Birmingham, which appears elsewhere in this issue.

A patient of Dr. Foxell's suffered from cancer of the oesophagus which proved to be inoperable. A gastrostomy was performed in hospital, and as he had lost over two stones in weight the hospital dietetic expert and the consultant surgeon decided the patient should have 2 oz. of fat a day as butter or margarine. Just before discharge of the patient from hospital Dr. Foxell gave to the local food office the necessary particulars and "the medical reasons why the extra rations are considered necessary." The local food officer granted the extra fat. Some days later Dr. Foxell received from this officer a copy of a letter from the divisional food officer of the Ministry of Food stating that the extra butter could not be continued. Dr. Foxell was informed that the medical advisers to the Ministry of Food considered there was "no need for extra butter in such cases as there is no call for a lubricant for swallowing as the operation allows the food to be inserted below the obstruction." No doubt the medical advisers to the Ministry of Food considered that Dr. Foxell and the surgeon who had done the operation were ignorant of these simple facts. Dr. Foxell, however, having the interests of his patient at heart, ignored the snub and explained in a personal letter to Dr. Edith Summerskill, Parliamentary Secretary for the Ministry of Food, that he had ordered, upon consultation with a dietetic expert, the extra fat in order to maintain the life of his patient. Dr. Summerskill, backed up by medical advisers who had not seen the patient, continued to treat at a distance, and allowed an extra 2 oz. butter *per week* "on compassionate grounds." Dr. Foxell concluded the correspondence with a letter on Nov. 29 to Dr. Edith Summerskill thus: "With reference to your letter of Nov. 18, the patient about whom I wrote died suddenly from haemorrhage a few days ago. Therefore my fight to try to prolong his life is now ended." One may be permitted to wonder what the patient in his last unhappy days thought of a State machine which deprived him of the 2 oz. of fat a day which he had been recommended in hospital. We may doubt whether he fully appreciated the humanity of the decision to allow him 2 oz. a week "on compassionate grounds."

HAEMATOLOGICAL HERESY*

BY

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One of my teachers used to say that every so often there should be proclaimed a kind of sabbatical year. For this time, firm in the resolve to add nothing to medical writing, we should sift what had already been written and try to formulate principles. Whether we like it or not, the war has given some of us several such years, though I doubt if we have made the most of them; for military life, even when leisurely, is little suited to calm reflection, and libraries are often inaccessible.

A cursory acquaintance with haematological writings before the war of 1914–18 is enough to show that studies of a basic nature were interrupted by that war and some have never been resumed. A few years later the world of haematology, and indeed of medicine, was dazzled by the finding of a cure for pernicious anaemia and by the admirable experiments of the Boston school that soon afterwards revealed the source of the liver factor. I mean no disrespect whatever to the authors of these entirely brilliant discoveries when I say that their work seems in some ways to have continued to dazzle the world of haematology from that time on. It is odd, for instance, that there is almost no mention in English medical textbooks of the artificial synthesis by Hans Fischer of a near relative of the pigment portion of haemoglobin—another event of the same period which must surely one day take its place as an achievement of the first rank; and I cannot help thinking that the theory of anaemia due to arrest of maturation in the bone marrow has enjoyed an undeserved immunity from criticism because it saw light as an explanation of one of the two or three most dramatic discoveries in medicine of the century. It is this theory that I am going to indict with such vigour as I can muster. But should this heresy, which, like many others, is only the revival of an older doctrine, one day become orthodox, I would be the first to say that the theory in its day appeared to bring order out of disorder, and did excellent service as a scaffolding on which haematological teaching could be based.

The theory of arrest of maturation as a cause of anaemia holds that, in the absence of a factor necessary for a particular stage in the ripening of red cells in the marrow, there may be an accumulation of cells which cannot develop further and a useless hyperplasia of the marrow. As one author put it, "it is as if a mass-production motor factory were unable to obtain an essential manufacturing part. Soon the assembly hall is crowded with unfinished cars, but outside the street is empty of vehicles." A simile from military life might here seem appropriate. It is as if recruits were poured into a training area but no trained troops emerge. When, however, to carry the simile a little further, it is discovered that the area is full of soldiers who have been equipped only with left-sided boots, and right-sided boots are supplied, troops pour forth into battle.

The Hopper Theory

At the height of its glory the theory of arrest of maturation (more intimately known as the "hopper theory," from the resemblance in diagrams of stored-up cells to grain in hoppers) included the liver factor, thyroxine, ascorbic acid, iron, and copper as factors necessary for different stages in the ripening of the red cell.

Thyroxine and ascorbic acid were never perhaps very strong members of the team, but they held a humble place. I like to think, though others might not agree, that some observations I made on anaemia in myxoedema (Bomford, 1938) first lost thyroxine its place. Briefly I showed that when hypothyroidism with liver deficiency and hypothyroidism with iron deficiency were excluded there remained some cases of moderate anaemia which could be cured, but very slowly, by thyroid alone, and only by this means. The blood picture in these cases resembled fairly closely that which had been produced in animals by exposing them to atmospheres richer in oxygen than the normal: and I suggested that the anaemia should be regarded as a compensation—in itself physiological—to the diminished needs of the body for oxygen. Unfortunately I did not examine my patients' bone marrow, but, collecting what scanty information there was available about the bone marrow in other hypothyroid states, I suggested that the bone marrow in myxoedema was relatively hypoplastic. That this is indeed the case was confirmed a year or so later (Jones, 1940). The uncomplicated anaemia of myxoedema appears, therefore, to be a partial atrophy of the erythron (a term that has been used to indicate the blood and the bone marrow considered as a single organ) as an adaptation to the diminished need of the body for oxygen, the bone marrow is relatively hypoplastic, and there is no evidence of an arrest of maturation.

Erythropoiesis in scurvy has also been the subject of a recent paper (Israëls, 1943). The existing knowledge was again scanty, and that author writes about three cases of his own, which appear to be the first in which the marrow was examined both before and after treatment. Briefly, Israëls found that before treatment there was diminished erythropoiesis in two patients, while in the third erythropoiesis was within the range of normal. After treatment with ascorbic acid the marrow showed increased erythropoiesis in all three cases. The effect of ascorbic acid deficiency seemed to be a depression of erythropoiesis rather than a failure of maturation at any particular stage.

I do not propose to say much about anaemia due to lack of iron or copper. There is no known human anaemia due to a deficiency of copper, but there is evidence that small traces of copper sometimes assist in cure of iron-deficiency anaemia. This may well be as a catalyst in some as yet unknown stage in the formation of haemoglobin. The normoblastic hyperplasia of the marrow in iron deficiency may simply be due to the fact that this particular part of the marrow is working overtime at the production of small and ineffective cells. Since, however, iron is the only one of the so-called maturation factors which is known to be a constituent of red cells an arrest of maturation of some kind is more plausible in this instance.

The Liver Factor in Anaemia

There is left for consideration the corner-stone of the theory—anaemia due to deficiency of the liver factor. Just before the war I travelled rapidly from the West Coast of America to London. In San Francisco I heard the theory roundly criticized—it has, I think, never really taken root in Western America (Dock, 1936). In Eastern America the subject was at least a proper one for discussion, but in London I found that to question the hopper theory in pernicious anaemia was to risk being cut in the corridor or common room. So from time to time in my enforced sabbatical years I have returned to ponder on this subject.

In morbid anatomy pernicious is distinguished from other anaemias by its association with changes in the alimentary tract, particularly atrophy of the gastric mucosa; by an increase in the amount of red marrow, which is of the type known as "megaloblastic"; by haemosiderosis of the liver and other organs; and by histological evidence of active phagocytosis of red cells by the reticulo-endothelial system. It is distinguished biochemically by gastric achlorhydria, by an increase of the bilirubin in the plasma, and by an increase in the urobilinogen or similar substances excreted, mainly in the faeces. It has a characteristic blood picture, in which the number of red cells is decreased more in proportion than is the percentage of haemoglobin, and the cells are mostly large, well stained, and unduly irregular in size and shape. Finally, it is distinguished therapeutically by the fact that it is completely relieved by the injection of small quantities of the liver principle, and that the onset of the remission is accompanied by a reticulocyte response of a particular kind.

How are these various features of the disease to be interpreted? Is the anaemia due to haemolysis, for which an accelerated rate of erythropoiesis is unable to compensate, as was generally thought until the last two decades? Or is it due to a diminished rate of erythropoiesis, brought about by an arrest in the process of maturation?

Consider first the increase of bilirubin in the blood, the increased excretion of urobilinogen, the haemosiderosis, and the histological evidence of active phagocytosis of red cells. An increase in the bilirubin of the plasma used to be thought to indicate an increase in the rate of blood destruction.

* Abridged from a lecture delivered to the Poona Military Medical Society.

but it is now regarded more as evidence of impaired liver function—of the liver's inability, that is, to deal rapidly enough with products of haemolysis. It can be neglected in this argument. The other features mentioned are regarded as indications that the rate of destruction of red cells is greater than normal in other anaemic states, and it is difficult to account for them otherwise in pernicious anaemia. Upholders of the theory of arrest of maturation usually say, therefore, that though a diminished rate of erythropoiesis is the chief cause of the anaemia, there is also present some increase in the rate of haemolysis, due to the easy breaking up of abnormal cells. But this, surely, is impossible, for simple calculation will show that the combination of a rate of erythropoiesis noticeably below normal with a rate of haemolysis noticeably above normal must lead to a rapidly progressive anaemia and an early exit.

The Part played by Haemolysis

A main argument against the haemolytic theory was that the rate of haemolysis, if the daily amount of urobilinogen excreted was in fact derived from the breakdown of haemoglobin, was so high as to be incredible. An example of an increase to thirteen times that found in health was quoted. It was therefore suggested that the urobilinogen was derived from precursors of haemoglobin, which had not been utilized because of the arrest of maturation at a stage, presumably, before the red cells acquire haemoglobin. But if it is incredible that haemolysis should be going on at thirteen times the normal rate, it is surely equally incredible that, in the presence of diminished erythropoiesis, the body should go on producing precursors of haemoglobin at thirteen times the normal rate? In point of fact, methods of estimating the daily excretion of urobilinogen in the stools and urine have improved since the time of these observations, and recent measurements show that the daily excretion in pernicious anaemia is usually not more than three or four times that in health. Such a rate of haemolysis is not incredible, and is little if at all greater than is found in other indubitably haemolytic conditions. My biochemist friends tell me that the supposition that these large quantities of urobilinogen are derived from hypothetical precursors of haemoglobin involves serious difficulties. So far as is known, urobilinogen can be derived only from the breakdown of porphin ring compounds, and the porphin ring compound of haemoglobin is formed only in developing red cells. It is difficult to see, therefore, how this increased amount of urobilinogen can be derived from anything but the breakdown of red cells, unless, indeed, it comes from some other respiratory pigment, and this seems unlikely. Further, if unused precursors of haemoglobin are excreted as urobilinogen, an increased excretion of this substance would be expected in iron-deficiency anaemia, for the response to treatment with iron suggests that there is no shortage of pigment in this disease. In fact, the excretion of urobilinogen is diminished.

The interpretation of the bone-marrow picture is linked with that of the reticulocyte response. For, according to the theory of arrest of maturation, the cells held up in the bone marrow pour into the circulation when the missing factor is supplied and give rise to the reticulocyte response. Or, to use the car factory simile, the missing part is supplied and the cars accumulated in the assembly hall pour into the street. If not this, what is the explanation of the reticulocyte response? It has been suggested by those who favour the haemolytic theory that reticulocytes, being young and tender, are more easily lysed than are mature cells. In other words, that the low count of reticulocytes before treatment is due to a selective lysis of reticulocytes. (There is a little evidence that a selective lysis of reticulocytes occurs in some forms of malaria.) When this process is brought to an end by treatment the reticulocyte count rises rapidly, and falls again slowly as matters readjust themselves. I am not sure that there is not an even simpler explanation. Let us return, admitting the fallacy of similes, to the car factory. On the haemolytic theory we must assume that the demand for cars is three or four times that which the moving belt was designed to produce. There is some acceleration, but this is not enough to supply the demand. Congestion then occurs in the early part of the assembly chain—not because the rate of production is diminished, but because cars cannot be fitted fast enough with necessary parts. When the demand falls rapidly and suddenly the moving belt, geared to the faster rate, does not at once adjust itself to a slower rate, and pushes a number of very new cars into the street. This kind of explanation would account for the fact that there is in some cases a shower of nucleated red cells as well as an increase of reticulocytes for a short period at the beginning of treatment.

Finally there is sometimes a reticulocyte response when anaemia with malaria is treated with quinine. This must surely be due to a sudden slowing of the rate of haemolysis, and it is polemical to suggest, as I have heard done, that anaemia in malaria is due to an arrest of maturation brought about by the malign influence of malarial toxins.

Of the bone marrow I will say only that Miller and Rhoads (1934) have produced a marrow picture in animals that in essentials appeared to resemble quite closely that of pernicious anaemia. This they did by bleeding the animals regularly, separating off the haemoglobin that had been removed, and reinjecting it as a solution—a manœuvre which reproduced some of the features of continued haemolysis.

Synthesis of Haemoglobin

Recent studies in the metabolism of pigments have possibly provided a means—though a difficult and very arduous one—of measuring biochemically and roughly quantitatively the rate of synthesis of haemoglobin (Dobriner and Rhoads, 1938, 1940). Briefly, the porphyrins of the animal body can be divided into types I or III according to whether they could theoretically be derived from types I or III of the four possible aetioporphyrins, or pattern types of porphyrin. All respiratory pigments, including haemoglobin, have a pigment portion which consists of a type III porphyrin. But normal persons excrete minute quantities of a type I porphyrin. It has been suggested that the type I porphyrin is formed as a by-product in the synthesis of the type III porphyrins needed by the body, and thus that the amount of this pigment excreted daily provides an indication of the rate of formation of haemoglobin. The rate of excretion of type I porphyrin is increased in haemolytic jaundice, in polycythaemia vera—conditions in which no one presumably would deny that the rate of erythropoiesis also is increased—and in pernicious anaemia. So far as this work has gone it seems to confirm that erythropoiesis is accelerated in pernicious anaemia, and this finding is of course incompatible with an arrest of maturation.

Suppose for a moment that the haemolytic theory is the correct one, and see in what other ways current views about the disease would need to be modified. The conclusions of the Boston school as to the source of the liver principle and its storage in the liver would of course stand unaffected. That the liver factor was in any sense utilized in the bone marrow was never more than supposition. We should have to assume that this factor in some way prevents a particular kind of haemolysis, possibly—and there is a little evidence for this—by altering the conditions of absorption from the intestinal tract. Now the multiplication of hypothetical toxins should probably be regarded as one of the cardinal sins of medicine (and will probably, like heresy in any form, be forbidden in organized services of the future by a medical administrative instruction), but it must be admitted that a return to the older theory of a haemolytic toxin, absorbed perhaps from the intestine, might help to solve some difficulties. It would help to explain those rare cases in which the presence of a small stagnant loop of intestine—too small to be expected seriously to interfere with absorption—is associated with an anaemia of the pernicious type (Barker and Hummel, 1939). Further, if the toxin had an avidity for lipids, it might explain not only the haemolysis but the particular type of red cell found in pernicious anaemia, for the shortage in this disease would appear to be of stroma or its constituents rather than of materials necessary for the formation of haemoglobin. And, finally, a toxin with a taste for the lipids of nerve cells as well as those of red cells might help to explain the association of this anaemia with subacute combined degeneration of the spinal cord.

Conclusion

To return to more practical things; since a near relative of the pigment portion of haemoglobin has been synthesized artificially, it should not be beyond the wit of man to discover how haemoglobin is synthesized naturally and what constituents

are actually necessary for the formation of red cells. There are signs that such inquiries are being pursued actively at the present time, and advances of this kind might well open the way to much new knowledge about the workings of the erythron.

I have stated the case for a reconsideration of the part played by haemolysis in pernicious anaemia in a provocative and, some may think, tendentious manner. There is, however, a case to be considered, as was realized in America before the recent war (Minot and Castle, 1939), and my object will have been achieved if some British haematologists are induced to give their minds to it.

I am grateful to the D.M.S. in India and to Col. J. H. Baird, A.M.S., for permission to publish this lecture.

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MENTAL DEFICIENCY IN NORTHERN IRELAND

A colony for mental defectives, providing ultimately for a thousand beds, within 20 or 30 miles of Belfast is recommended by the Mental Health Services Committee, whose report to the Minister of Health and Local Government is obtainable from H.M. Stationery Office (price 1s.). In a foreword the Minister (the Rt. Hon. William Grant) says: "The report gives a clear picture of the problem to be solved and contains many valuable recommendations as to the action which we in Northern Ireland might usefully take. It has been endorsed in its entirety by the Health Advisory Council. New legislation would be necessary to bring into operation a mental deficiency scheme, and this aspect of the matter is receiving consideration. I feel, however, that before the Government presents proposals to Parliament it is desirable that the committee's report should be made available to the public."

In Northern Ireland, says the report, there is no Mental Deficiency Act, no institution, no community supervision, and there is only one special school (in Belfast), which is unable to meet even local needs. Apart from the inadequate provision made by the Education Acts and the Poor Relief Acts, the responsibility for dealing with mental defectives has not been placed by statute on any authority, and for the most part these unfortunate people, estimated on the basis of parallel figures for England (Wood Committee) to number about ten thousand in the whole Province, lead a hopeless existence at home, in Poor Law institutions, or in mental hospitals. The problem of mental deficiency has, by years of neglect, developed into a grave social evil.

Four Classes of Defectives

The committee is of opinion that the education authorities should accept responsibility only for those backward children who are educable and socially efficient, and that all mental defectives should come under the aegis of the mental deficiency authorities. "It follows, therefore, that any definitions of mental defectives for the purpose of a Mental Deficiency Act should be based on the conception of social inefficiency rather than of educational inefficiency." Mental defectiveness is defined by the committee as meaning a condition of arrested or incomplete development of mind existing before the age of 18 years, whether arising from inherent causes or induced by disease or injury. It divides mental defectives into four classes:

Class 1: Persons in whose case there exists mental defectiveness of such a degree that they are unable to guard themselves against common physical dangers.

Class 2: Persons in whose case there exists mental defectiveness which, though not amounting to that of Class 1, is yet so pronounced that they are incapable of managing themselves or their affairs or, in the case of children, will when older be incapable of doing so.

Class 3: Persons in whose case there exists mental defectiveness which, though not amounting to that of Class 2, renders them socially inefficient to such a degree that they require care, supervision, and control for their own protection or for the protection of others, and in the case of children special training also.

Class 4: Persons in whose case there exists mental defectiveness of such a nature that their behaviour is strongly antisocial and they require care, supervision, and control for the protection of others.

Ascertainment and Executive Powers

As mental deficiency is most often discovered during the school years the initial task of ascertainment will fall on the health services operating under the Education Acts. The committee recommends that where a medical practitioner is of opinion that a person is a mental defective it should be compulsory for him to notify the mental deficiency authority, with whom should rest the final responsibility of ascertaining whether there is disability of mind amounting to mental deficiency. It should be a statutory requirement that when, as a result of conducting mental tests, a teacher, educational psychologist, or school medical officer has reason to suppose that a person is a mental defective, a notification, with reports, must be sent to the mental deficiency authority to enable the case to be reviewed by the authority's psychiatrists.

The committee recommends that in Northern Ireland the Ministry of Health and Local Government should be the central authority and that a regional authority should be established rather than that the task of administration be thrown on the county and county borough councils. The regional authority should be composed of representatives from the county and county borough councils and other interested bodies. It should be responsible for ascertainment, the provision and administration of institutions, and the supervision of defectives in the community. In addition local mental health committees should be formed to advise the regional authority and co-ordinate the activities of persons interested in the problem. The committee believes that the duties of the authorities relating to mental deficiency would be most efficiently carried out as an integral part of a general mental health service for the Province. In order to bring this about there should be either an actual amalgamation of, or the closest possible co-operation between, the mental deficiency authorities and the authorities administering all the other mental health services.

Other recommendations are that it should be permissive for all classes of defectives to be submitted for treatment to the regional authority at the instance of a parent or guardian; that in any Northern Ireland legislation the mental deficiency authority should be given powers to deal compulsorily with all ascertained defectives, and it should be obligatory for appropriate care, supervision, and training to be provided; and that persons who suspect they are mental defectives should, if over 18, have the right to submit themselves for examination and appropriate treatment by the mental deficiency authority. "It is wrong to wait until the defective gets into trouble or runs foul of the law before affording him the care, supervision, and training which his mental condition requires and which it is in his own interests to receive. Mental deficiency is often hereditary, and we consider it wrong to leave any power in the hands of mentally defective parents. . . . Each case would be carefully examined by the competent authorities, and many would be allowed to remain at home or elsewhere in the community if adequate care and supervision could be provided there."

MEDICAL FOUNDATION OF EPSOM COLLEGE

The Royal Medical Foundation of Epsom College appeals to all members of the medical profession who do not already do so to subscribe to the Foundation, the object of which is to help the families of less fortunate colleagues. The Foundation in 1946 has provided more than £15,000, as follows:

	£
50 ordinary pensions	1,500
41 Foundation scholarships for boys (educated, clothed, and maintained entirely free of cost)	6,748
13 scholarships for girls	570
25 Council exhibitions for boys	1,541
138 pensions and annuities of varying amounts ...	3,023
Grants towards education of 51 boys and girls ...	1,408
Grants to widows and spinsters	335

In order to maintain this assistance the Foundation has to rely upon the generosity of subscribers and donors for over £10,000 a year. Without sufficient help from them the existing benefactions would have to be curtailed. Owing to lack of funds, many deserving applicants—medical men, widows, and children of school age—remain unassisted. The Sherman Bigg Fund enables the Foundation to make educational grants for those who cannot obtain scholarships. Donations to augment the income of this Fund would be most welcome. Subscriptions and donations for whatever aspect of the work may be sent to the Secretary, Epsom College, Surrey.

SYNTHETIC INSECTICIDES IN THE TROPICS

A team of three entomologists, two chemists, two field officers, and a laboratory technician have been making experiments, under the direction of the Colonial Office, on the effectiveness of synthetic insecticides—D.D.T. and gammexane—in the control of insect pests in East Africa, and results were reported by Dr. C. B. Symes, Senior Medical Entomologist, Kenya, on Dec. 10.

In 1944 the Colonial Office was able to obtain sufficient D.D.T. for an experiment on a reasonable scale in malaria control in Kenya. Solutions were applied to the interior wooden surfaces of houses, with promising results considering the small scale of the experiment. In 1945 the team was formed, and certain areas of vegetation were selected in Uganda, including isolated islands and headlands of Lake Victoria, for a full-scale experiment in combating the tsetse fly and the malaria parasite. In fighting the tsetse fly two areas, one of 40 and the other of 100 acres (0.16 and 0.40 sq. km.), were taken and the bush was treated in the one case with D.D.T. and in the other with gammexane. The fly populations in these areas were measured, and small portions selected where the flies appeared to be in greatest number. The actual intensive spraying was carried out over 2 to 4 acres (8,000 to 16,000 sq. m.) of jungle. After a single application of either D.D.T. or gammexane the fly population was found to have diminished by about 50%, and on a further application of gammexane in double the amount the decrease was carried to 80%. The substances were found to be having little effect a week after application, owing partly to the fact that the insecticide was applied in an oily solution which was readily absorbed by the leaves and stems of the vegetation and partly to the prolonged sunshine, which broke down the power of insecticides after a certain time. It was not possible to bring about complete disappearance of the insects by a single application.

The effect of repeated applications on the same patch of vegetation was tried over a period of fifty or sixty days—significant because of the approximately fifty-day life-cycle of the tsetse fly. The fly population was reduced by about 99% in one such experiment, but a later experiment was vitiated by natives who brought herds of cattle to the experimental regions, and thus linked up those regions with an untreated area. The question arises of economy in treatment of large areas of vegetation. One plan would be to distribute the insecticide by aeroplane, but unless there is some means of lateral dispersion this would touch only the top layers. Another possibility is the use of smokes, but then there is the difficulty of changing winds.

Control of Insect Vectors

Six of seven native sub-districts in rural Uganda were sprayed with synthetic insecticides, the seventh being used as a control. These experiments, generally speaking, indicated that oily solutions of both D.D.T. and gammexane proved effective in Uganda in stopping the rising seasonal incidence of malaria in the rural population. But such solutions were largely lost by absorption in the mud walls of native houses. A solution of gammexane powder mixed in water and applied with a sprayer was tried, and reduced the "malaria parasite-rate" in the area by one-half in three months. The powder in water was not taken in by the absorbent surfaces to anything like the same extent as a straight solution in oil, and it is hoped that dispersible powders will prove of value in malaria control. Experiments by various investigators in different parts of the world do not all accord with the Uganda experience. Some have found the preventive use of D.D.T. solutions against malaria to be of no particular advantage, while others have made sweeping statements as to the efficacy of the method. The Uganda operations certainly seem promising, but, of course, they require critical examination. In some other places the observations have been confined to the effect on mosquitoes, but in Uganda the malaria itself has been measured and it is in the "malaria rate" that the most striking results are shown.

The work is being extended by investigators in tropical Africa who are applying these synthetic insecticides to the control of various major pests and disease vectors. In Kenya some promising results have been obtained with the use of D.D.T. in the control of *Simulium ochracemum*, a small fly which breeds in running water and causes oncocercosis, a serious problem in parts of Kenya and elsewhere. It is an advantage that this work is being done under the aegis of the Colonial Office and financed centrally, instead of being undertaken by the individual governments; there is more likelihood of consistent and large-scale results being obtained. It is the general feeling of the Colonial Office authorities that special research teams are well worth while.

No attempt has been made to evaluate the relative merits of D.D.T. and gammexane. Gammexane used against insects has a more rapid effect than D.D.T., but it is more volatile and likely to be lost. New and improved insecticides may well appear, and when the best manner of using them is worked out it is quite possible that they may revolutionize life in the Tropics.

TUBERCULOSIS ALLOWANCES

A deputation from the Joint Tuberculosis Council (*Journal*, Dec. 21, p. 955), supported by additional representatives of associated organizations, of the Hospital Almoners' Association, and the Tuberculosis Care Workers' Association, waited on the Ministry of Health on Nov. 15, 1946. The deputation was received by Sir Arthur Rucker, with Sir Wilson Jameson in the chair. Representatives of the Ministry of National Insurance, the Assistance Board, the Department of Health for Scotland, and other officers of the Ministry of Health were also present.

For the Ministry it was explained that it fully accepts the view that tuberculosis calls for special provision in the interests both of the patient and of public health, but that this provision in future would have to be made within the general pattern of the new social legislation. The new National Insurance Act would provide benefits in various adversities on a scale that it was hoped would, in general, be adequate in itself. There would be those, however, who would need something more, and this would be forthcoming under a National Assistance Bill which was now in preparation to sweep away the Poor Law and to give effect to a new concept of Government assistance for those in need. Tuberculosis patients would be basically provided for in this way, conforming with the general pattern of social security. But, by virtue of their special needs, the Assistance Board would, it was hoped, be empowered in the new Bill to make payments to needful persons under treatment for pulmonary, but not for non-pulmonary, tuberculosis on a scale higher than the normal scale of assistance applicable to the community as a whole.

The Ministry took note of criticism regarding the deduction of family allowances from payments under the present tuberculosis scheme, and the alleged inadequacy of the general scale-rates under this scheme. Increased rates of allowances are now to be made for dependants under 16 years of age. (*Supplement*, Dec. 21, p. 162.)

The Nuffield Provincial Hospitals Trust is advised by a Scottish Committee on matters relating to hospital or ancillary services in Scotland. The trust has a medical committee which has lately issued a second interim report, presenting as appendices memoranda which have been submitted to it during the last two or three years on a health service for university students, the care of the chronic sick and the aged and infirm, standards of hospital services, the place of the hospital almoner in the regional health scheme, and a report on the health and sickness records bureau in Glasgow. This last report is a condensation of the full account of the incidence of acute perforated peptic ulcer in the West of Scotland (*British Medical Journal*, 1944, **2**, 617, 655).

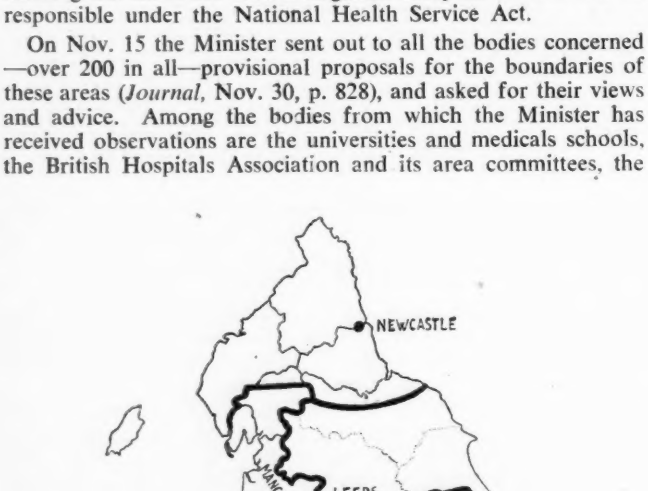
Dr. A. Grieg Anderson, who is chairman of the Medical Committee, in a report on a health service for university students brings forward a draft scheme for medical examinations for Aberdeen students by a whole-time medical officer who is soon to be appointed. Dr. Duncan Leys suggests that all medical staff at a hospital above the rank of registrar might have a definite obligation to consult without fee in patients' homes at the request of any doctor in practice in the area, unless their terms of appointment specially recognize this to be impracticable. Sir Alexander Macgregor and Dr. Crawford Knox write useful memoranda on the standards for nursing staff in hospitals.

AREAS OF REGIONAL HOSPITAL BOARDS

THE FIRST STEP

As the first step towards setting up the administrative machinery for the future hospital service, the Minister of Health (Mr. Aneurin Bevan) on Dec. 20 laid before Parliament an order defining the areas for which Regional Hospital Boards will be responsible under the National Health Service Act.

On Nov. 15 the Minister sent out to all the bodies concerned —over 200 in all—provisional proposals for the boundaries of these areas (*Journal*, Nov. 30, p. 828), and asked for their views and advice. Among the bodies from which the Minister has received observations are the universities and medicals schools, the British Hospitals Association and its area committees, the



three Royal Colleges, the King Edward's Hospital Fund for London, the Nuffield Provincial Hospitals Trust, and the local health authorities (county and county borough councils). In the light of these views he has made a number of modifications, of which the following are the more important:

1. Wigan and district and Crewe and district are associated with Manchester instead of with Liverpool. [Note.—Representations have been made that the area of the Liverpool region is inadequate to meet the needs of a large medical school and modern teaching hospital. The force of this contention is realized, and the needs of the Liverpool region have been kept in mind throughout. It is felt, however, that they can best be met by administrative arrangements rather than by varying the regional boundaries, which would create other difficulties. There has long been a close link between the Liverpool hospitals and North Wales, and this will be preserved by providing representation for Liverpool representatives on the Welsh Regional Board. Similarly there are links between Liverpool and North Lancashire which will be maintained by appointing for that area a subcommittee of the Manchester Regional Board on which Liverpool representatives will sit.]

2. Goole and neighbourhood are associated with Leeds instead of Sheffield.

3. Burton-on-Trent and neighbourhood are associated with Birmingham instead of Sheffield.

4. Hinckley is associated with Sheffield instead of Birmingham.

5. The whole of Bedfordshire is associated with London instead of the northern part being associated with Cambridge.

6. High Wycombe and district are associated with Oxford instead of London.

7. West Dorset (except Lyme Regis) is associated with London instead of Bristol.

8. North-east Gloucestershire and North-east Wiltshire (including Swindon) are associated with Oxford instead of Bristol.

Details of the regional areas are given in the Order, which is: No. 2158.—The National Health Service (Determination of Regional Hospital Areas) Order, 1946, dated Dec. 18, 1946, made by the Minister of Health under section 11 of the National Health Service Act, 1946 (9 and 10 Geo. 6. c. 81).

Reports of Societies

PROBLEMS OF RENAL LITHIASIS

In the Section of Urology of the Royal Society of Medicine on Nov. 28 Mr. R. H. O. B. ROBINSON, the new president, delivered his address on "Problems bearing on the Aetiology, Diagnosis, and Treatment of Stone in the Upper Urinary Tract."

Relationship of Infection to Stone

Organisms in the urine in the pelvis of the kidney might change from time to time, and this suggested that its composition varied considerably, and that organisms absorbed from the bowel and then excreted might, or might not, find conditions favourable to their growth.

Calculi associated with hyperparathyroidism were a well-recognized group at the present time, but a point not so well appreciated was that they could occur without any lesions of the bony skeleton. Deficiency of vitamin A disturbed the calcium–phosphate ratio and produced changes in the epithelium of the urinary tract. Stones found in such circumstances were of Randall's type 2, starting as tubular inspissation of calcium phosphate, but after prolonged vitamin deficiency severe tubular changes occurred. In patients suffering from peptic ulcer, calculus was attributable to the high intake of milk, alkalis, and calcium carbonate, with a resultant alkaline urine, but few statistics were available.

Calcium–phosphorus metabolism was probably the most important factor in stone formation, as calcium figured in all types of stone under discussion. The metabolism of citric acid had a definite relationship to the formation of renal calculi. Oestrogens increased the citrate excretion in the urine and lowered that of the calcium. The addition of citrate would prevent precipitation of calcium phosphate from solution, and this effect was maximal in alkaline solution, in which calcium phosphate was least soluble. This was obviously an ideal mechanism for the kidney to prevent precipitation of calcium phosphate; a further step in prevention would be a reduction of the phosphate ions, and this could be brought about by the administration of aluminium hydroxide gel, which formed a highly insoluble aluminium phosphate in the gut, thus reducing the absorption of phosphorus.

Treatment of Calculi

The indications for active surgical intervention were obstruction of the drainage mechanism of the kidney, as evidenced by intravenous pyelography. Non-operative treatment was indicated under the following conditions: (1) Limitation of the calculi to the cortical part of the kidney, where they had no macroscopic connexion with a calix; (2) mobile stones not causing obstruction and of such a size as to make passage *per vias naturales* possible; (3) stones composed of calcium phosphate or mixed phosphatic stones; (4) bilateral stones, associated with gross disease and limited function in both kidneys, rendering any operation hazardous.

Much could be done by forced fluids, by correction of faulty diet, and by attempts to control superadded infection. Postural drainage might be very helpful in dislodging a stone. In the case of decubitus calculi or phosphate stones attempts

might be made at solution with Suby's G fluid used before secondary infection, particularly with urea-splitting organisms, supervened.

In the operative approach to the kidney, incision in the line of the twelfth rib, with subperiosteal resection of the rib, was favoured. Calculi should preferably be removed by pyelolithotomy, and with a proper exposure and suitably curved forceps the calices could be entered and stones removed from the pelvic incision. Incision in the long axis of the ureter with suture, if haemostasis was complete, was preferred unless the pelvis was thickened and friable. Nephrolithotomy was an undesirable operation.

The indication for active surgical intervention was dilatation of the upper urinary tract above the stone, particularly if infection was superadded. If neither dilatation nor infection was present a conservative attitude could be adopted indefinitely. Impaction of ureteric calculi commonly occurred between second and third lumbar vertebrae, or on the pelvic floor in the terminal part of the ureter.

THE PROBLEM OF TONSILLECTOMY

At a meeting of the Liverpool Medical Institution on Nov. 21, with the president, Dr. G. F. RAWDON SMITH, in the chair, Mr. T. B. LAYTON opened a discussion on the responsibility of the physician in the problem of tonsillectomy.

Mr. Layton said that this operation was carried out too often and for indications which did not bear close scientific inquiry. The physicians referred patients for tonsillectomy with the idea of removing the focus of sepsis, and if after full investigation they expressed the view that the tonsils were at fault, this was difficult for the surgeon to refute. He outlined the indications for the operation and drew attention to the danger of operating during the winter months and epidemic periods. It was only streptococcal infections of the tonsil which gave rise to trouble.

In the discussion which followed, Dr. G. F. RAWDON SMITH emphasized that the size of tonsils and amount of adenoid tissue removed at operation had lessened considerably during the past twenty-five years. Dr. R. W. BROOKFIELD referred to the difficulty of determining whether the tonsils were at fault. Two attacks of tonsillitis in one year with persistent rheumatic pains justified tonsillectomy, and was often a prelude to complete resolution in those cases of acute nephritis which had continuing albuminuria and haematuria.

Mr. HORACE MATHER considered that the general practitioner and the mother should be adequately consulted before tonsillectomy was undertaken in children. Dr. W. GRANT MCAFEE inquired about the indications for the removal of tonsils in the diphtheria carrier. Mr. R. J. MARTIN raised the question of the school child with constant colds referred for the operation. Probably tonsils and adenoids were responsible for a small proportion of these cases, and tonsillectomy was only indicated in recurring attacks of tonsillitis or in gross obstruction. Dr. C. A. CLARKE pointed out the danger of removing children's tonsils when there was an epidemic of anterior poliomyelitis. In Australia a statistically significant number of cases of this disease had occurred in children who had recently had their tonsils removed.

A British Council for Spastic Paralysis was constituted at a London meeting on Dec. 12, under the chairmanship of Prof. J. M. Mackintosh. There are thousands of children and adults suffering from this disability in Great Britain, and the main object of the new council will be to encourage and organize research into the best means of education and treatment and to provide adequate school, hospital, and other facilities. The new council is widely representative and has been assured the active support of the Ministry of Education, the Ministry of Labour and National Service, the Ministry of Health, the Ministry of Pensions, the Scottish Education Department, and the Department of Health for Scotland. A constitution has been adopted covering a wide range of objects, including discovery and registration of cases, establishment of special day and residential schools, clinics, and vocational training. There is one small teaching unit already in existence, and promise of establishment of special schools for children suffering from this disability near Croydon, Birmingham, and Plymouth.

Correspondence

A Foretaste of Control?

SIR,—Early in October a patient of mine suffering from carcinoma of the oesophagus was discharged from hospital. He had had a gastrostomy carried out, an exploratory thoracostomy having shown the growth to be irremovable. He had lost over 2 stones (12.6 kg.) in weight, and the hospital dietetic expert, in agreement with the consulting surgeon, decided it was necessary for the patient to have 2 oz. (60 g.) of fat a day in the form of butter or margarine. He was given this in hospital in addition to 2 pints (1.1 litre) of milk a day and other substances that would pass through the gastrostomy tube.

When he was about to be discharged I wrote to the local food office (in accordance with Form MED. 1, p. 7) "a detailed medical statement, giving full particulars of the applicant's condition and the medical reasons why the extra rations are considered necessary." As the result of this confidential report the local food executive officer granted the extra fat. Some days later this officer sent me a copy of a letter from the divisional food officer of the Ministry of Food, dated Oct. 14, 1946, and signed by the a/assistant divisional food officer:

"I have now received a reply from Headquarters that our medical advisers are of the opinion that in cases of gastrostomy the important point in relation to food is that the food chosen is such that will go through the gastrostomy tubes. In their opinion there is no need for extra butter in such cases as there is no call for a lubricant for swallowing as the operation allows the food to be inserted below the obstruction.

"It is their opinion that in these cases, however, it would be advisable to permit a priority allowance of two pints of milk and eggs at the rate of three per week, and perhaps in this case the doctor will be satisfied if the extra allowances are granted.

"I shall be glad, therefore, if you will point out to the doctor the allowances recommended by our advisers, giving the reason why they are not prepared to recommend extra butter. Medical report is returned herewith."

In response to this communication I wrote a personal letter to Dr. Edith Summerskill "as a doctor" (a favourite expression of hers), as I felt it was wrong to reduce my patient's fat ration—he was only just holding his own in weight. I pointed out that my patient was not ordered butter "as a lubricant for swallowing" but as a means of feeding him with extra fat, as considered necessary by the hospital dietetic expert; also, that the Ministry had entirely missed the point that the extra fat was necessary to help to maintain life. I further commented that the Ministry's medical advisers could not fully understand the case, not having seen the patient. It was not until nearly three weeks later that I received a letter dated Nov. 18, 1946, from Dr. Summerskill's private secretary:

"Dr. Summerskill has asked me to reply to your letter of Oct. 30 recommending an extra allowance of butter for one of your patients.

"The refusal of the extra allowance by our local office was fully in accordance with the recommendations of our medical advisers. Dr. Summerskill feels, however, that this is a case where an extra 2 oz. of butter per week should be allowed on compassionate grounds."

"Compassionate grounds" indeed! So the patient was to be allowed to have less than what was considered necessary for life. The necessity of maintaining life was apparently dismissed and the patient was to be allowed, "on compassionate grounds," to go downhill by the recommendation of the medical advisers to the Ministry. The end came, and I wrote on Nov. 29:

"With reference to your letter of Nov. 18, the patient about whom I wrote died suddenly from haemorrhage a few days ago. Therefore my fight to try to prolong his life is now ended."

I pointed out that it seemed wrong that the opinion of a general practitioner of very considerable experience—especially when supported by a distinguished consulting surgeon and a recognized dietetic expert—should be overruled by the medical advisers to the Ministry who had never seen the patient. Is this a foretaste of control?

And now it is all over, a question comes to mind. Recently the G.M.C. struck off the *Register* a doctor who had given panel certificates without seeing the patient. What might well

be asked is the position of medical advisers at the Ministry who, without seeing the patient, advise against the opinion of the doctors in charge of the case.—I am, etc.,

Birmingham. HUMPHREY FOXELL.

National Health Service Act

SIR,—It was a tragic day for medicine when it became a political issue, but for this the profession is not responsible. As many doctors have not had the time to read the Act or the full account of the debates during its passage through both Houses of Parliament, it is well that we should be told that the doctor is "first a citizen." This apparently harmless statement can mean nothing less than that a doctor must submit his clinical judgment as to what is best for his patient to the overriding authority (or duties) imposed by bureaucracy in the name of the people. Many German doctors are now being sentenced for criminal offences committed by order of their government for the alleged welfare of the people. It is also well that the Willesden Borough Council should have let the cat out of the bag, thereby eliciting a gentle rebuke from the Minister for not having the taste and good sense to wait a little longer. It should now be plain to all what is going to happen in a year or two, when there will be only one employer.

We can respect the sincerity of those who, through fanatical adherence to a group, large or small, lose their powers alike of clear thinking, detached observation, and foresight, but for the rest of us there can no longer be any doubt of a quickening pace of totalitarianism, both precept and practice, in central and local government in this country. Persecution of opposing minorities is spreading rapidly, and even freedom of conscience is looked upon askance.

Apologists for the Act claim that its remaining defects are but minor matters, but can we accept this description as apt for the clauses (retained owing to the refusal of the Minister to accept amendments pressed by our professional representatives in and passed by the House of Lords) that permit the Minister to refuse submission of the Central Health Services Council's report to Parliament, and deny the right of appeal to the courts by an aggrieved practitioner? It is further claimed that the doctors have no right to decline to co-operate in the application of the Act, more particularly as they do not yet know how it is to operate. The answer to this is that Parliament did not hesitate to pass an Act the ultimate implications of which it knew nothing. The Minister was handed a blank cheque. If the doctors enter into discussions on such a basis they will be held jointly responsible for the outcome, although there is no reason to suppose that the Minister will take any more notice of their views at this stage than during the passage of the Act through both Houses. If we then protest and try to withdraw, the Minister can accuse us of entering freely and willingly into discussion, and then, out of mulish obstinacy, trying to sabotage the scheme sanctioned by Parliament and demanded by the nation.

The issue is surely clear. The Act is a bad Act, inimical to the welfare of the patient and endangering the freedom of the doctor to serve his patients as he sees fit. Let the doctors make this plain and leave it to the Minister to frame his regulations and take full and sole responsibility for the Service. Those doctors who then feel they can enter it with a clear conscience will do so. We must make no mistake about it. The writing on the wall at Willesden, and in the denial to the doctors of the elementary right of all citizens—appeal to the courts—is there for all to see. There can be no doubt that this is a moral and ethical issue of the first importance. The temptation to sell our birthright for a mythical security will be strong for many, but for those who succumb there will be no turning back, no second chance.—I am, etc.,

London, W.1. ALAN MABERLY.

SIR,—Dr. H. B. O. Cardew's letter (Dec. 7, p. 873) needs to be related to its setting. I have no real fear that its substance will influence any members of the profession, but one has recently encountered several muddled and vacillating minds. Dr. Cardew contested Weston-super-Mare in the General Election and is now, I believe, prospective Socialist candidate for a local constituency. I think it may justly be said that his ambition is political rather than professional.

Most of his plausible statements can be refuted. We are not fighting this Act for political motives. The profession has had a raw deal from all political parties, and the last direct (and successful) fight was with a Conservative Minister in 1923. It is true that the B.M.A. has for many years urged a comprehensive health service, confirmed by the profession in 1944, and that the electorate probably approve the idea, but the majority of the profession cannot, and I am certain that the majority of the thinking electorate will not, approve the National Health Service Act—a polycephalic, trichotomous monster, even armed with the traditional spiked club. The Minister has built for us, without "meeting us doctors in a reasonable spirit," a cumbrous and forbidding barracks, detention cells, kettledrum, and all. And now, says he, will you come into my parlour and discuss decorations, furnishings, and pieces of silver?

The B.M.A. runs on thoroughly democratic lines, and the Council have the duty of implementing the decisions of the meetings of representatives. Four representatives of the Services are elected annually to Council. The "tens of thousands of members" (total membership 52,500) have only themselves to blame if the local committees, Divisional representatives, and members of Council, for whom they did not trouble to vote, may not always represent their wishes. Failure of the democratic intention can occur owing to inertia or ignorance of the *demos*. And it is precisely for that reason that the A.R.M. last July asked for a plebiscite of the whole profession, including those on active service. Can anything be attempted more democratic than this?

Doubtless Dr. Cardew will be able to blind himself to these things so that he may continue faithfully to toe the party line and to use the profession and Association of which he is a member as fodder for his political platforms. Political motes many of us may have, but it is quite clear where the political beams are.—I am, etc.,

Bristol. A. GORDON HERON.

SIR,—Dr. Lennox Johnston in his letter (Dec. 7, p. 874) says: "The 'fundamental principles' on which the B.M.A. has taken its stand are not moral principles. They are merely political. . . ." It is hard, however, to understand how politics can be kept out when discussing an Act of such grave significance not only to our profession but to the whole community. Political views are in the main based on moral principles—some no doubt of a higher and some of a lower variety. I trust, however, that Dr. Johnston does not think that the higher standard is only the possession of those who believe in the Socialist doctrines. Conservatives believe in private enterprise and consider that the natural rewards that fall to industry, ability, and foresight have a high moral value. They see nothing wrong with private ownership and private profit honestly come by, and they consider that brisk competition is the best way, at the present stage of human development, to secure good service.

Doctors who hold these views must feel that the National Health Service Act as at present framed is likely to be harmful, and it is their duty to resist it by all fair and lawful means; and further, that to enter into negotiations about the details with a Minister who refuses to consider alteration in the fundamental principles can only be futile, and would give the impression to the public that we agreed with these principles. To give way now because we fear we would suffer in a struggle with the Government, as suggested by Dr. Johnston in his last sentence, is advice difficult to reconcile with his previous insistence on moral principles. If there are not sufficient doctors available the Act must be unworkable, and medical service will have to continue as at present until the basic principles of the new Act are made more acceptable. There is no question of any illegal action nor of a doctors' strike—both points which ought to be made very clear—I am, etc.,

Wakefield. D. H. RUSSELL.

SIR,—The vital importance of the subject impels me to comment on some of the letters in the *Journal* of Dec. 7. Mr. W. Etherington-Wilson and others (p. 874) have realized that this matter is not merely a small sectarian one affecting the doctors alone but a threat to the very liberty of a section of the British people and an utter negation of all we have fought for in two

terrible wars. Some of us seem to have become so confused as to think that a "No" in the plebiscite indicates a vote against a National Health Service; that of course is nonsense. What we object to is an Act which has been ruthlessly imposed on us, not only without reasonable consultation on its terms, but in wilful opposition to certain principles which the Government knew well we held dear and would fight for—a method once popularly known as the "dictatorship of the proletariat."

Dr. H. B. O. Cardew (p. 873) talks of a "clear mandate from the people." Nonsense! The "people" were not a majority of the community, and the vast bulk of them knew nothing (and still do) and cared less about a National Health Service, except that it was "something for nothing" (they were not told the cost) and only one plank in the Utopian platform on which the workers were to sit at ease while the good things of life appeared by magic. Even if the Government *had* had a clear mandate it was not a mandate to impose terms which were an outrage on the liberty of the subject and which cannot but act, as only we seem to realize, to the ultimate disadvantage of the most important person of all—the patient.

Dr. Lennox Johnston (p. 874) admits in his final sentence that the Minister has called *his* bluff at least; he disguises thinly with a paean of praise for the principles of Socialist society that it is his own welfare which is his main concern. I do not blame him for thinking of that; we are all concerned for our livelihood; but we can at least fight for it, and we are by no means at the last ditch yet.

I have voted against negotiation because we have had sufficient experience of the present Minister's conception of the word and his own denial of it to know that it would be a farce unless backed by a strength equal to his own; and also, so far as I can see, any terms negotiated might well be only temporary as they could afterwards be altered by a stroke of the Ministerial pen. Before we can honestly negotiate terms we must have the Act so amended as to restore our liberty if we join the Service, and it would appear that we must impress on the Government that we have not fought and won a war against dictatorship only to submit to it disguised as democracy of the Soviet pattern.—I am, etc.,

Fitzwilliam. J. S. LAURIE.

SIR,—At a time when medical men are threatened with the loss of the goodwill of their practices and hospital governors are in danger of losing their hospitals, the following quotation from Plato's *Republic* seems very apposite.

"This form is a despotism, which proceeds not by small degrees but by wholesale in its open or fraudulent appropriation of the property of others, whether it be sacred or profane, public or private: perpetrating offences, which if a person commits in detail and is found out, he becomes liable to a penalty and incurs deep disgrace; for partial offenders in this class of crimes are called sacrilegious, men-stealers, burglars, thieves, and robbers. But when a man not only seizes the property of his fellow-citizens but captures and enslaves their persons also, instead of those dishonourable titles he is called happy and highly favoured, not only by the men of his own city but also by all others who hear of the comprehensive injustice which he has wrought."

It should also be remarked that Plato forecast the successive forms that government may take: aristocracy, then its overthrow by oligarchy, and its overthrow by democracy. According to Plato democracy inevitably paves the way for tyranny, the future tyrant being at first the selected champion of the commonalty but gradually becoming more and more powerful, obtaining increasing authority under specious pretences and finally turning out a consummate tyrant. Has not this prince of ancient philosophers a message for the medical profession (and, indeed, the whole community) to-day?—I am, etc.,

Weston-super-Mare. CYRIL G. EASTWOOD.

SIR,—Surely the first and most essential points for the honour and prestige of our profession are that the customs and usages, including the right of private practice and the buying and selling of such, shall be forcibly insisted on and clearly agreed to by the Minister of Health before any further talk, and, if refused, any further discussion be promptly broken off and bluntly refused. No recently qualified man should bear any pecuniary loss, as the B.M.A. has ample funds and he will be well supported.

I suggest that the excellent letter on the plebiscite (Nov. 9, p. 707) written by our former highly respected Secretary, Dr. Alfred Cox, be carefully reread.—I am, etc.,

Birmingham. E. T. LARKAM.

SIR,—I suggest that a brief and explicit statement be made to the Minister of Health and to the lay Press that the medical profession is not only willing but desirous to co-operate in working a good National Health Service Act, but it refuses to work a bad one. Doctors are best qualified to judge whether the Act is good or bad, and they have decided that the present Act is a bad one. Many words give rise to confusion of thought.—I am, etc.,

Cheltenham. J. RUPERT COLLINS.

Willesden and the Plebiscite

SIR,—I wonder if the word "Willesden" will make those who answered "Yes" think again and write and say they should have answered "No." Willesden, I think, has shown what we may expect if we put our heads in the noose. I cannot help feeling that the B.M.A. did not put the case clearly.

Our representatives decided that the medical profession demanded among other things (*a*) no direction, (*b*) no basic salary, (*c*) sale and purchase of practices to continue. If we are going to insist on these it is useless to negotiate. Neither Mr. Bevan nor the B.M.A. can negotiate on these principles. They are passed into law, and that leaves the position as follows: If we insist on sticking to those three and any other essential demands, get the Act altered allowing our demands, and we will be only too willing then to negotiate on Regulations.—I am, etc.,

Leicester. FILMER COLEMAN.

SIR,—It is quite clear that the Willesden incident has fundamentally altered and clarified the relationship between the medical profession and the Ministry of Health. Why not register this? There should be another plebiscite: "Are you willing to work as a Civil Servant under the Ministry of Health?" There would be an astonishing response to this. The B.M.A. should be active, not passive, for the time is now very short.—I am, etc.,

A. NORMAN LEEMING,
Old Colwyn. Late President, N. Wales Branch, B.M.A.

SIR,—First, "No" by a considerable majority of general practitioners; then a unanimous and resounding "No" by the Willesden doctors and nurses. I cannot doubt that if the Willesden "No" had been recorded before the plebiscite, there would have been not a considerable but a nearly unanimous "No" by the general practitioners. All who are not made blind by doctrinaire dope can now see the prematurely disclosed Socialist threat—a mental concentration camp for the profession.

I am the youngest practitioner in this area. I do not belong to any political party, but when I see a party endeavouring to make my profession a totalitarian tool I know I doubt the integrity of that party in spite of its professed ideals.

We must indeed close our ranks and agree to negotiate only with prior Government assent to the Principles so ably enunciated by our Negotiating Committee—this assent being secured by Act of Parliament. While we are prepared to take our part in a health service for the nation, we are not willing to prostitute our ideals for the sterile security now offered to us. Let us therefore say "No" with growing voice until our Principles are conceded to us.—I am, etc.,

Teignmouth. GEORGE A. F. QUINNELL.

Trade Union for Doctors

SIR,—I am an ardent believer in the preservation of all individual liberties that do not directly conflict with the good of the community and dislike the dictatorial attitude of the Willesden Borough Council and the whole idea of the "closed shop." At the same time is it not necessary for us to form a really effective trade union now that the N.H.S. Bill has become law?—I am, etc.,

London, W.14. C. W. ROE.

The Plebiscite

SIR,—I agree with several of your correspondents that the plebiscite paper was too lengthy and difficult to understand. Many believed that if they replied "No" they jeopardized their future opportunities for work in any hospital, such being at the disposition of a Minister who has not shown understanding of the personal relationship of doctor and patient. His attitude of "abhorrence" of what seems to us normal and right proves his ignorance of our profession. As a matter of fact even many of the public mistakenly believe that when a practice has been sold they are obliged to summon the new doctor who has bought the practice. They do not know that they have a right to go to any doctor whom they prefer. Possibly Mr. Bevan has the same misapprehension, which would explain his "abhorrence" of the sale. In reality a sale implies that a suitable successor is likely to follow; and that he is introduced to the patients, with complete notes of their maladies and of the important matters in their family history.

Here is the true history of a case which would have suffered sadly under Mr. Bevan's dictatorship. An elderly physician, full of wisdom, contracted tuberculosis from a patient and was slowly dying. He had a large family, and was in despair as to their future, as he had been a bad business man and could have left no money for the children's education. He saw several young men who were keen to buy his large practice; he selected the one most suitable and for a whole year was able to pass on to him his experience and his wisdom. The young man was grateful and soon able to redeem his debt for the purchase of an inimitable opening; and all the patients stayed with him, equally grateful that the younger man had full information as to their condition and the remedies best suited to them.—I am, etc.,

London, W.1. AGNES SAVILL.

Objectionable Certificates

SIR,—Ministers of religion, relieving officers, medical practitioners, and other qualified persons are being asked to sign confirmatory certificates for the Ministries of Pensions and Social Security, the Army, and other departments, in which they are asked to certify that "the claimant is known to me personally and that all the statements in this claim are true to the best of my knowledge and belief." (Forms C.P.1., W.P.1., M.N.1., and O.A.P.17.) I submit that in spite of the saving clause the latter half of this certificate is objectionable because the witness is being asked to warrant the accuracy of the claimant's answers to questions on a wide range of subjects of which the witness cannot possibly be fully informed. A commissioner for oaths will only attest a claimant's declaration on oath that the statements he has made are true. A medical practitioner or other witness should not be asked to combine the roles of guarantor and unqualified commissioner.

In my opinion a suitable formula is that used by the Ministry of Pensions (L.C.109): "I hereby certify that the foregoing declaration was signed this day in my presence and I believe him/her to be the person who he/she represents himself/herself to be. Signed." This certificate should be sufficient to satisfy all parties. The supplementary inquiries found on certain forms as to whether the witness is the claimant's employer, regular medical attendant (A.F.O.1842A), or practising within five miles of the claimant's residence are completely irrelevant and unnecessary.—I am, etc.,

Leeds. J. H. E. MOORE.

Physiology of Vision

SIR,—I really must protest against the travesty of my discoveries presented by Prof. H. Hartridge (Sept. 28, p. 473). I discovered that the responses of the "eye" to its natural stimulation by light had their parallels in the stimulation of beating hearts by drugs. Previous to Burridge it was firmly believed that these parallels ought to be found in the phenomena elicited by the application of electric currents to the frog's muscle–nerve preparation. Actually the parallels were never found, with the result that a science of visual stimulation has grown up which is a collection of conflicting theories, each of which attempts to rationalize some one fact of visual stimulation with the assumption that a parallel ought to be found in that muscle–nerve preparation. When I first made that discovery the stimulating drugs were unknown. It now seems likely that acetylcholine functions as the drug in respect of the central nervous system, and that some of the "drugs" produced by the action of light on visual purple stimulate the end-organs of the eye. But, judging by the theories produced, many physiologists still believe that a drug "ought" to act like an electric current.

Having found that a retinal end-organ behaved like a beating heart, I tried out the possibilities that amplitudes determined brightness and rates determined colour; and they worked. Granit is now proving that rates and colours are associated. But also, if "eyes" behaved like beating hearts, it should be possible to augment strengths and slow rates as well as to augment and quicken. When I first used these facts not enough was known about visual purple to make full use of it. Now I teach my students that it seems to me likely that different lights produce different "visual-drugs" from visual purple and that some of these "drugs" augment and quicken while others augment and slow.

From this new standpoint my students just work things out; they learn in fact to predict colour phenomena. Thus, denoting the normal retinal rate by the letter n, then any colour based on quickened rates becomes denotable by the term $(n+x)$, and any colour based on slowing may have its rate denoted by the term $(n-x)$. My students then just put $(n+x)$ and $(n-x)$ together, as it were, and deduce that every colour "ought" to have an opposite or complement such that when the two act together they should give a common result. What is thereby predicted is; and the student learns in a few lines more about the neutrality of grey or white than can be taught in a whole chapter of attempted explanations.

Prof. Hartridge refrained from accepting the challenge that a valid theory of dark adaptation would provide an explanation of the colours of Benham's top. In contrast with this my students here, in the examination held at the end of their first term of study, were able to give satisfactory replies to a question wherein they were required to show that the existence of dark adaptation was compatible with the artist's division of colours into the warm, cold, and neutral. To Prof. Hartridge such a question could well savour of madness, but my students answered it in a few lines because it was so easy.—I am, etc.,

Rangoon. W. BURRIDGE.

Micturition after Vaginal Plastic Operations

SIR,—I was interested to read of Mr. A. A. Gemmell's method of dealing with the bladder after vaginal repair operations by the instillation of 0.5% mercurochrome (Nov. 30, p. 833). I have no statistics to offer, but it might be of interest to some were I to detail briefly my post-operative treatment for such cases which I have employed for many years with satisfactory results.

It is impossible to tell beforehand which patient will have reflex retention of urine, but a considerable number do have that complication, so I try to forestall it. After the operation is finished, a single gauze swab soaked in paraffin and flavine is inserted right up to the vault of the vagina as a light pack, the end just protruding from the orifice of the vagina. This is left in for 48 hours. An indwelling rubber catheter is also retained in the bladder for the first 48 hours. A clip is put on the catheter and released periodically. The bladder is never allowed to contain more than a few ounces of urine and is kept well below the normal distension limit. If the bladder is allowed to distend, due to reflex retention, the patient suffers much distress and the operation may be prejudiced by strain on the catgut sutures. If the clip is not released sufficiently frequently, some urine may escape at the side of the catheter and the wound may be wet with urine. It is seldom that patients have any trouble with micturition after the catheter is removed. If this does occur, however, it may be replaced for another two or three days. I am satisfied that there is far less risk of infection of the bladder in this method than if a catheter has to be passed repeatedly, however carefully as to asepsis. An over-distended bladder certainly predisposes to infection. This condition is akin to that found with residual urine.

The paraffin–flavine pack serves five purposes: (1) It is soothing to the tissues. (2) It is antiseptic. (3) It tends to prevent

immediate adhesions from forming between the anterior and posterior wounds. (4) When removed it carries away with it any blood or clots that may be lying in the vagina. (5) It prevents urine from running into the vagina. There is special liability for this to happen when a patient is lying on her back. From the very beginning of the first week in bed the patient is encouraged to move the lower limbs, especially the ankle joints, freely in order to obviate the risk of venous stasis with the possibility of clotting and embolism.

Patients are kept lying in bed after operation, without once raising themselves or being raised, for two weeks. During the third week they are free to sit up in bed. At the end of three weeks they get up. A few days later they are allowed home, but are given special instructions as to carefulness about refraining from any undue strains for the next two months. Before leaving hospital they are examined, a finger being inserted into the vagina so that any small plastic adhesion between anterior and posterior wounds may be broken down. Two months after leaving hospital the patient reports for a final examination so that the result may be assessed. I have found that this routine has given excellent results and it is quite simple to carry out as far as the nursing is concerned.—I am, etc.,

Dundee. A. E. CHISHOLM.

Smallpox in the Vaccinated

SIR,—As a ship surgeon concerned with the vaccination of crews I find myself in agreement with Dr. C. Killick Millard, who recommends (Oct. 12, p. 552) that vaccination of those likely to be exposed to smallpox should be carried out on the principle of "little and often." In the course of about thirty-five years at sea I have had to deal with smallpox on five occasions, though in only one instance was a member of the crew involved. This latter occurrence led me to reduce the interval between revaccination from two years to one year. I consider yearly revaccination a necessary and sufficient routine measure for the type of population referred to. Exceptionally, cases of modified smallpox do occur within a year of successful vaccination, and I have encountered instances of successful revaccination repeated within an interval of much less than a year; but the answer to these exceptional cases of comparatively fleeting immunity is not, I think, to reintroduce multiple-mark vaccination for all but to note anyone in whom this tendency is suspected and revaccinate him more frequently.

The duration of immunity after successful vaccination appears to be a personal characteristic (possibly a family one) independent of the number of marks made on vaccinating. On the one hand one finds the man with a small solitary scar made in infancy and conferring lifelong immunity of a high degree, and on the other hand the man with one or both arms pitted with a series of multiple marks in whom immunity must be short-lived.

For the past twenty years I have used the intradermal method of vaccination, and I often find it possible to obtain a successful result by this method when recent attempts by scarification have failed. In dealing with large numbers the method is time-saving as well as economical, as no primary dressing is required. Seamen who protest against revaccination can usually be persuaded to have an immunity test carried out by this method, and infants can often be vaccinated while asleep. Finally, for those interested in the study of immunity reaction the intradermal puncture affords an ideal opportunity of observing the rate of development of the areola and papule, etc. In this connexion I have carried out the procedure on myself on some sixty-odd occasions during the past few years and can testify as to its simplicity, safety, and reliability.—I am, etc.,

Rustington. A. GARDNER.

Grafts for Fractured Neck of Femur

SIR,—I was greatly interested to see Mr. F. P. Fitzgerald's description (Dec. 7, p. 861) of his instruments and technique for the insertion of chip grafts in fractures of the neck of the femur. For some time I have been thinking and hoping that the superior osteogenic and vascularizing power of medullary grafts from the crest of the ilium would help to reduce the vexing number of cases of non-union and avascular necrosis seen in these fractures after simple nailing. I was therefore much encouraged to read that Mr. Fitzgerald's results have been very satisfactory, particularly as I have recently had a somewhat similar set of instruments made to my design and have not yet had sufficient time to judge the success of the results.

I use a one-piece pencil graft cut from the iliac crest with a saw made from thin-walled 3/8 in. (0.9 cm.) tubular stainless steel with the teeth cut at one end—i.e., a trepanning saw. With this an excellent graft can be cut in a matter of seconds with the aid of a pneumatic drill. The graft is then slid via a cannula into a tunnel drilled into the head of the femur. I am able to insert both the graft and the nail without having to expose the femur, thus saving time and lessening shock in the most frail and ancient patients.—I am, etc.,

Bedford. G. S. STORRS.

Amoebiasis

SIR,—Dr. G. W. Hayward is to be congratulated on his excellent article on amoebiasis as seen in Italy which was published in the *Journal* of Sept. 28 (p. 457) of this year, and which has only recently reached me. His description of the more chronic and insidious manifestations of amoebiasis is most opportune in view of the large number of troops still returning to the U.K. from amoebic endemic areas. I would, however, beg to disagree on certain points concerning amoebiasis as seen in India nowadays and add a few remarks concerning diagnosis and results of treatment.

In the Far Eastern theatre during days of war frank dysenteric symptoms of amoebiasis were common, due mainly to massive infection often occurring in debilitated personnel and also to concomitant bacillary infection, the role of which will be discussed later. These cases were usually treated with sulphaguanidine either in unit lines, in field ambulances, or casualty clearing stations, with, in the majority of cases, a resultant cessation of diarrhoea. They were then returned to the fighting line only to suffer at a later date the inevitable relapses with diarrhoea, abdominal disturbances, loss of weight, and sometimes hepatitis. Through the long passage back to a base hospital via "normal lines of communication," during which time the patients were often inadequately treated, the disease had ample time to become chronic, the amoebic ulcers being secondarily infected with a variety of pathogenic organisms which seemed to prevent the anti-amoebic drugs from having their full effect. Such cases were eventually evacuated to U.K. having had many courses of anti-amoebic treatment with little effect, until the advent of penicillin plus sulphonamides, which combination clears the large bowel of secondary infection and allows the anti-amoebic drugs their full action. This course now cures the majority of cases. Previously results of treatment in these cases was admittedly poor, and a certain number of them perforated and died of the resultant peritonitis or succumbed to amoebic hepatitis. It must be emphasized that such cases have rarely arisen in India Command either during or since the war, and are now, to the best of my knowledge, seldom seen in any part of the Far Eastern theatre. They were due mainly to the exigencies of war which caused delay in treatment, while part at least of the dysenteric symptoms was due to a co-existing bacillary infection, a finding which has been extremely common. I do not believe that the underlying amoebic infection differs from that seen in other parts of the world, for when early and adequate treatment was given to these cases they almost invariably did well.

The question of mixed infections is one of very considerable importance, and some observers go so far as to say that all cases of amoebic dysentery are primarily associated with a bacillary infection. The sequence of events is as follows. A patient is admitted with diarrhoea, the stools containing blood and mucus. Microscopically, red cells, pus cells and macrophages, Charcot-Leyden crystals, and vegetative *Entamoeba histolytica* are seen. If in order to clear the bacillary infection sulphaguanidine is given, the diarrhoea usually ceases, and, this being very important, red cells, pus cells, and frequently *E. histolytica* disappear from the stools, a point first described by Ransome and Stokes. This disappearance of *E. histolytica* is presumably due to healing of the amoebic ulcers by eliminating the bacillary element. It is therefore of fundamental importance that even a seemingly straightforward

case of bacillary dysentery occurring in endemic amoebic areas should have very careful stool and sigmoidoscopic examination to ensure that no amoebic element exists. If this is omitted the patient will often be readmitted after a few weeks with the more insidious forms of amoebiasis.

To-day the type of case most commonly seen in India is that described by Dr. Hayward—the chronic case in which ill-health insidiously attacks the patient almost without his knowledge. Vague abdominal symptoms, of which flatulence and a sense of fullness occurring after a few mouthfuls of food are common; abdominal pain or discomfort, usually in the right iliac fossa and never severe; loss of weight, which is not rapid but which is in some cases as much as 1–1/2 stone (6.3–3.1 kg.); tiredness, lassitude, irritability, and lack of concentration: these are the commonest symptoms. Diarrhoea is seldom complained of, and a history of a certain periodic looseness of the bowels is only elicited on direct questioning. On examination patients look tired and unwell, the loss of weight often showing itself most noticeably in the face. The most valuable physical sign, as stressed by Dr. Hayward, is thickening and tenderness of the caecum and ascending colon, which sometimes can only be ascertained by deep palpation. Patchy tenderness over various parts of the colon has not been seen. Sigmoidoscopy has been very helpful, though the number of cases in which vegetative or cystic forms of *E. histolytica* have been found in a sigmoid swab when absent from the stool has been negligible. The changes seen in the rectal mucosa are more valuable pointers to the diagnosis. Stool examinations have not been so successful as in Dr. Hayward's cases, although I have not adopted so rigorous a means of purgation, having found that one or two large doses of salts early in the morning are sufficient to produce several watery stools.

Although positive stools have been found in the majority of cases, a group remains in which, from all points of view, the diagnosis of clinical amoebiasis seems justified. They presented the typical picture of chronic amoebiasis as previously described, but with entirely negative stools repeated up to a dozen times following purgatives, and an entirely normal rectal mucosa. These cases seemed to be caused by a very chronic amoebic infection strictly localized to the caecum. At first one was chary of giving these patients a course of treatment lasting for a month, but, having seen the dramatic improvement which has occurred in all cases so treated, there is now no hesitation in starting treatment in any case in which one feels certain of the diagnosis of amoebiasis, despite negative laboratory findings. I speak with some feelings on this point, having myself experienced the welcome return of well-being after treatment, which was not in my case aided by bed-rest.

Treatment has been along the lines laid down by the Army in India—i.e., "diodoquin" tabs., 3 t.d.s., days 1 to 20; emetine, 1 gr. (65 mg.) intramuscularly, days 1 and 2; emetine bismuth iodide, 3 gr. (0.2 g.) at night, days 3 to 14; carbarsone, 4 gr. (0.25 g.) b.d., days 15 to 20. This treatment has been entirely satisfactory, and since its adoption approximately one year ago I have not yet seen a single relapse. There is no doubt that the adoption of "diodoquin" in place of retention enemata has made treatment far easier for the patient and nursing staff and far more effective.

I would end by again stressing (and it cannot be stressed too often) the utmost importance of realizing the existence of these chronic forms of amoebic infection and of investigating them on the lines suggested by Dr. Hayward in his paper. In this way much chronic ill-health and many cases of amoebic hepatitis may be avoided.—I am, etc.,

FRANCIS T. PAGE,
Capt., R.A.M.C.

Namkum, India.

Prevention of Infant Deaths

SIR,—I have read with great interest Dr. J. Tudor Lewis's excellent and informative article on the prevention of infant deaths (Dec. 14, p. 893). I agree with Dr. Lewis that there is need for the closest co-operation between maternity units, hospital, and home services, and I commend the trial scheme which he has described.

In connexion with the cases quoted it would be interesting to know the weight of each of the seven infants on discharge from the hospital or maternity unit. This information would enable one to assess whether these infants might well have been kept in hospital for a longer period. This applies in particular to the five of the seven cases which were premature or immature, for it has been my practice to keep such premature infants in hospital until a weight of seven pounds has been reached; thus one is assured that the infant is robust on discharge and has a better chance of survival than if it is discharged when it has regained its mere birth weight.

Respiratory complications arose in four infants. It is well known that partial atelectasis tends to occur in weakly and premature infants. Moreover, respiratory infection of a latent or chronic type is so often missed because the clinical picture is dominated by dietetic difficulties and there is little, if any, rise in temperature. I would stress therefore the importance of *regular clinical examination of the lungs during the time the infant is in hospital.* One finds so often evidence of a patchy bronchitis, or occasionally more ominous localized patches with sharp crackling rales suggestive of an early pneumonic consolidation. Regarding Case 7 it is stated: "Antenatal clinic attended regularly," and later: "Mothercraft not very good." To my mind this is an important point and shows how hospital antenatal clinics concentrate unduly on the obstetric and medical aspects of pregnant women, neglecting the ever important principle of teaching mothercraft during the antenatal period.

More emphasis should be placed on teaching the mother in her home, and health visitors should be especially trained in paediatrics, visiting homes more frequently than is the custom and having the fullest co-operation of the family doctor. It is in this latter respect that much improvement could be effected and the mutual antagonism existing so often between the family doctor and health visitor be eliminated. Perhaps medical officers of health might consult their local authorities to consider the advisability of setting up a panel of general practitioners in the district with special experience of paediatrics, who would be willing to visit and treat infants in their homes when the health visitor is not satisfied with the progress of such infants. The work of this group of doctors could be enhanced by including in this panel consulting hospital paediatricians whose clinical knowledge of the infant would render great service to the scheme. The realization by the public health authorities and indeed by the medical profession as a whole, of the efficient co-ordination of all services vital to the well-being of the mother and her newly-born infant will be a big step forward towards the ideal we seek to attain. Until this is generally accepted we cannot hope for any noticeable improvement.—I am, etc.,

ISAAC ROSE.

Leeds.

Gastro-enteritis in Maternity Hospitals

SIR,—Publicity has recently been given to outbreaks of gastro-enteritis in the nurseries of some maternity hospitals. An outbreak of apparently similar nature occurred in the autumn of 1944 at the Royal Hampshire County Hospital at Winchester. Careful investigations by the research laboratory failed to disclose the causative organism, and it was presumed to be a virus infection. In spite of treatment which included blood transfusions by various routes we had a number of deaths among those infected, particularly the premature infants. Finally it was decided to employ sulphonamide medication, and in view of the gastric disturbance it was felt that probably sulphadiazine would be most easily tolerated. The dosage given was one-sixteenth of a gramme every four hours combined with alkalis. The effect was quite remarkable, and the remaining cases cleared up within the course of two or three days. After dealing with one or two further incipient cases the epidemic completely subsided. I think our experience at the hospital may be of use in dealing with similar outbreaks, and it is a treatment that I should not hesitate to employ should we have the misfortune to have any recurrence of this very disquieting disorder.—I am, etc.,

C. J. PENNY.

Winchester.

Immunization against Whooping-cough

SIR,—I note with interest Dr. H. Sugaré's letter (Dec. 7, p. 87[illegible] on the subject of immunization against whooping-cough. My experience in this matter has been very encouraging and may be worth recording. I have been medical officer to an orphanage since 1941 and have made a practice of immunizing a

children against whooping-cough as soon after admission as practicable, using a stock vaccine and giving three injections of 1 ml. at weekly intervals followed by a fourth after a further four weeks. Where children have not been previously immunized against diphtheria I have combined the third and fourth doses with the appropriate dose of A.P.T.

In spite of the fact that there has been a considerable and prolonged epidemic of whooping-cough in the district, to which the children have been exposed by contact in school, and that at least two new admissions were found to be in the acute stage of whooping-cough, we have not had a single case among the inoculated children.—I am, etc.,

Harrogate. H. CRAVEN PETCH.

Lactic Acid Injections in Osteoarthritis

SIR,—During the last year I have treated over 60 osteoarthritic joints with lactic acid and have had most encouraging results. The knee- and shoulder-joints are very quick to improve, but it is only fair to warn patients with advanced hip disease that any improvement must take a considerable time.

Dr. Mawson's statement (Nov. 9, p. 691) that up to six injections are given if needed is very misleading. In the twenty or so hips I have treated it is only in the very early cases that any rapid improvement has been obtainable. I feel sure that Mr. Grant Waugh (Dec. 7, p. 876) will agree that severe hip-joints with cartilage destruction and mushrooming of the head of the femur will require an injection once a fortnight for a year or more before any permanent benefit can be expected.—I am, etc.,

London, W.1. VERNON HETHERINGTON.

"Analgesic" or "Anaesthetic"?

SIR,—Dr. J. N. Fell (Nov. 9, p. 711) has registered a protest against the use of the term analgesic. I believe that the exclusive use of this word whenever applicable would be rather pedantic, and I am not aware that there is in fact any real attempt to substitute it for the more commonly used term anaesthetic. Macintosh and Mushin, in the preface to their book, *Local Anaesthesia of the Brachial Plexus,* explain that although analgesia is the more accurate word, they frequently use the more comprehensive term.

Dr. Fell has accurately defined the two words, but thereafter his reasoning seems rather faulty. "Novocain" and cocaine and other local anaesthetic agents do not abolish all sensation in the affected area. They do abolish pain, and are therefore true analgesics: they do not abolish touch, deep pressure, and thermal sensibility, and are not therefore strictly anaesthetics. No one expects a local anaesthetic agent to abolish sensations outside the local area in which they are acting; it is therefore irrelevant to argue that they do not normally affect sight, hearing, or consciousness. Neither analgesia nor anaesthesia implies loss of motor conductivity, and the occurrence of this phenomenon is not used as an argument justifying the use of either term.

I frankly do not understand what Dr. Fell means by intravenous general analgesia. I hope he is not referring to intravenous barbiturates, for these drugs are hypnotic, sedative, and anaesthetic, but not analgesic. The only intravenous general analgesic in common use is intravenous morphine. It is a well-established fact that the first stage of general anaesthesia, except with the barbiturates, is a state of analgesia. For some unknown reason Dr. Fell calls this fact a crowning absurdity. Finally, is analgesia such an ugly word? It is surely less likely to be mispronounced by the laity than anaesthesia and its derivatives.—I am, etc.,

London, W.1. F. W. ROBERTS.

Plant Names

SIR,—The identification of the larger fungi is not of much practical importance until one is faced with a case of fungus poisoning, and Dr. P. D'Arcy Hart's most interesting Mitchell Lecture (Nov. 30 and Dec. 7) does not show much use for them as a source of antibiotics. But may I nevertheless make a small protest against his description of *Clitocybe gigantea* as the "fairy-ring mushroom"? In England this name belongs to *Marasmius oreades,* an unrelated species which is responsible for the familiar rings.

For many years now a common English plant with a common English name has masqueraded in medical literature under the horrible Americanism "alfalfa." And only the other day I heard one of the leaders of our profession express surprise that our native *Senecio jacoboea* does not cause hay fever, like the North American species which shares its vulgar name. For much that comes to us across the seas we should be grateful, but may we not keep our own names for our own plants? One other point: is not the inclusion of *Clitocybe* and *Buellia* among the higher plants an unmerited promotion?—I am, etc.,

London, S.E.1. C. P. PETCH.

Age Limit in Advertisements

SIR,—Frequently there appear in the *Journal* and other papers advertisements inviting applications for whole-time posts under the various Ministries. To quote the wording: The posts are permanent and pensionable in accordance with the general rules governing the grants of pensions in the Civil Service. Candidates must be under 45 *and preferably younger.* The salary offered is £1,150 to £1,500.

There must be many men and women who after a hard life in general practice would be glad to apply for such posts but are barred by the age limit imposed. These doctors would be quite capable of doing the work from a physical point of view and have, moreover, years of experience behind them, not only of the special work appertaining to the particular post but in dealing with the psychology of the individual. I am of course fully aware that for superannuation one must enter any scheme at 45 or under, but surely this difficulty as far as the medical world is concerned could be surmounted. I feel sure that many doctors over the above age limit would be glad to have a sure income and lighter work without any question of superannuation, especially if they were offered the maximum salary on taking over the post. They could hold the post while physically fit or retire at their own option. Gradually, as time will take its usual toll, vacancies could then go to the younger people.

Under the new Health Act and the Industrial Injuries Act there will be, necessarily, scores of whole-time posts created, and *under the present regulations* these posts will go to the younger men, leaving the older ones to work the Acts (always presuming they will be worked) as best they can under their own physical limits. This surely is not going to benefit the public when it has been stated that at least 50,000 doctors will be required to work the National Health Act efficiently. Less than half that number are available and the required number will not be reached for years. Why then should an age limit be applied?

I myself am well over the age of 45, but physically fit, with many years of general practice, including hospital appointment as physician in charge of out-patients and referee to many industrial and life assurance companies. It may be asked why I do not retire. The simple answer is that I cannot afford to do so owing to the economic conditions of to-day. I am not anxious to take service under the Act as a general practitioner, but I shall be compelled to do so since any compensation I may receive for my practice would be quite insufficient to keep me in my present standard of living. There may be many doctors in like circumstances, and I visualize that we shall have to keep on working in a general practice and so shorten our days unless we are given the opportunity of living longer by obtaining a whole-time post with its lighter work. I think this is a matter which should engage the attention of the Council of the Association, and especially of the Negotiating Committee if and when they do negotiate.—I am, etc.,

DUNMAR.

A circular from the Ministry of Health points out that local authorities should not disregard family allowances when assessing the resources of applicants for relief under the Blind Persons Act, or for tuberculosis allowances, or for any purpose for which the assessment varies with the size of the applicant's family. The National Health Service and the National Insurance Scheme are designed to eliminate any apparent anomalies that may exist, but until they come into operation double allowances should be avoided.

Obituary

A. R. NELIGAN, M.D.

We regret to announce the sudden death on Dec. 8 of Dr. A. R. Neligan, who in later life was well known as a spa physician at Droitwich, but before then had been for twenty years physician to the British Legation in Tehran.

Anthony Richard Neligan, son of J. W. Neligan, M.D., was born in 1879 at Tralee, Co. Kerry. He was educated at Whitgift School and St. Bartholomew's Hospital, where he had a distinguished career, winning the Brackenbury scholarship in medicine, the Matthews Duncan gold medal and prize in obstetrics, the Skynner and Burrows prizes in pathology. He graduated M.B.Lond. in 1903, and after serving as house-physician to Sir Norman Moore and Sir Archibald Garrod became interne gynaecological assistant under Sir Francis Champneys. He had been honorary secretary of the Hospital Amalgamated Clubs and later one of the three founders of the Students' Union. He represented Bart's, the United Hospitals, and Surrey County at rugby football. In 1906, after taking his M.D. and while demonstrator of pathology under Sir Frederick Andrews, Neligan was appointed by the Foreign Office to the post at Tehran on the death of D. F. Odling, who had spent thirty years in Persia. Neligan found the professional and social life in Tehran most interesting; it included service at the Legation dispensary, where poor Persians had received free treatment for more than a century, and consulting work among Europeans and Persians. He started the first pathological laboratory in the capital and carried out all the clinical pathology. For twenty years he had a place as the British representative on the Persian Sanitary Council and was its vice-president for a year. He did especially good work in the prevention of malaria and small-pox, and was first director of the public vaccination service. The village of Gulahek, where the Legation spent the summer, came to be spoken of as a sanitary model for the country. In the war of 1914–18, during which he was retained in Persia by our Foreign Office, Neligan was lent, with his friend J. S. Scott, to the Persian Government to reorganize its hospital at Tehran. He was a founder and first secretary of the Tehran Medical Society and adviser to the Legation on Persian opium traffic. When he retired in 1926 he received the thanks of the Secretary of State. On returning home he took up the study of chronic rheumatic conditions, visited medical centres in Europe, the U.S.A., and Canada, and made lasting contacts with men of like interests. As its first superintendent he helped to organize the Red Cross Clinic for Rheumatism in Regent's Park (1930), and later settled at Droitwich in spa practice and took part in the proceedings of British and international societies concerned with rheumatism and physical medicine. At Droitwich he was honorary physician to the Royal Brine Baths Clinic, and chairman of the fund for treatment of rheumatism in poor persons. He was a medical officer in the Home Guard during the last war and a member of the Worcester Medical Board.

Neligan joined the B.M.A. in 1920, he served on the Spa Practice Committee for several years, and was a member of the Rehabilitation Committee up to the time of his death; he also served on the Spa Practitioners Group Committee from 1934 onwards. A man of most kindly and courteous nature, he will be much missed by many friends. Bart's has had no more loyal son, and his election as a governor gave him great pleasure.

On Jan. 1, 1947, an Order-in-Council will bring under the control of the Dangerous Drugs Act the following drugs and preparations which have not hitherto been so controlled. Dihydrodesoxymorphine (commonly known as desomorphine), pethidine (1-methyl-4-phenyl-piperidine-4-carboxylic acid ethyl ester), or any preparation, not being a preparation capable of external use only, made from extract or tincture of Indian hemp. From Jan. 1 next, therefore, it will be unlawful for any person who is not authorized to manufacture, supply, procure, or possess any of these drugs. Doctors and retail chemists should therefore be careful to comply with the regulations regarding the issue of prescriptions and the keeping of registers in respect of these drugs.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The following appointments to posts in the Department of Biochemistry and Pathology in connexion with Addenbrooke's Hospital have been made from Oct. 1, 1946: University biochemist to the hospital, N. R. Lawrie, Ph.D.; university morbid anatomist and histologist, A. M. Barrett, M.B., B.Chir.; university bacteriologist, M. H. Gleeson White, M.B., B.S.Lond.

The forthcoming appointment of a Huddersfield lecturer in special pathology is announced in the *University Reporter*. The person appointed will be required to undertake research and give instruction on viruses and on diseases produced by viruses. Candidates should send their applications to the secretary of the Appointments Committee of the Faculty of Biology "B" at the Department of Pathology, Tennis Court Road, Cambridge, to reach him by Feb. 1. Further information about the duties and conditions of the post may be had from Prof. H. R. Dean at the Department of Pathology.

UNIVERSITY OF SHEFFIELD

The following appointments were made at a meeting of the University Council held on Dec. 13: *Lecturer in Physiology*, Q. H. Gibson, M.D., Ph.D. *Lecturer in Medicine for Dental Students*, W. D. Wallace, M.Sc., M.B., Ch.B. *Lecturer in Surgery for Dental Students*, M. F. A. Woodruff, M.D., M.S. *Assistant Tutor in Medicine at City General Hospital*, K. J. G. Milne, M.D.

UNIVERSITY OF EDINBURGH

At a Graduation Ceremonial on Dec. 13 the following degrees were conferred:

M.D.—[3]M. W. Archdall, [2][3]L. F. Brown, [2]E. M. Donaldson, [2]J. Greenstein, [2]A. F. Lang, T. Macleod, [2][3]I. R. Milne, R. W. G. Ransome-Wallis, [1]G. D. Steele.

D.Sc.—*Department of Pure Science*: Lydia D. Parsons, M.D.

M.B., CH.B.—H. I. O. Armstrong, G. H. Blair, J. Calder, G. R. Duffes, Jane T. Y. Forrest, Mary G. Forsyth, G. R. C. D. Gibson, A. C. Jacob, Muriel G. James, D. L. Kirk, W. H. Lloyd, J. M. Loughran, N. C. Low, A. MacLennan, Jean C. I. Melville, Catherine S. Paterson, J. P. Payne, J. C. Phemister, K. Robertson, C. M. C. Smelt, Anne M. Stewart, I. C. Wilson, [3]J. H. Young.

The following degrees were conferred in the Polish School of Medicine at Edinburgh:

M.D.—A. J. Baranski, J. F. Majeranowski.

M.B., CH.B.—B. Adamski, S. Dyakowski, M. Gonszor, A. Jarosz, A. Kepinski, J. Klimczynski, T. Klosowski, J. K. Koziol, J. G. Lipski, W. Mitus, Z. Prokopowicz, Anna M. Sokolowska, M. Szamocki, Z. Teleszynski, S. Wilczynski, Hanna H. Wozniak, S. Wozniak, W. Zaleski, W. Zarski.

[1]Highly commended for thesis. [2]Commended for thesis. [3]*In absentia.*

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At an ordinary meeting of the Council of the College, held on Dec. 12, with Sir Alfred Webb-Johnson, Bt., President, in the chair, Prof. Ian Aird, F.R.C.S.Ed., was admitted *ad eundem* to the F.R.C.S.Eng.

The Hallett Prize was presented to Mr. R. P. Melville (Sydney).

Mr. J. G. Turner and Prof. Evelyn Sprawson were elected Charles Tomes Lecturers for 1947.

Mr. P. H. Mitchiner was appointed editor of the forthcoming College publication.

A diploma of Membership was granted to E. N. Rees (Cardiff).

Diplomas of Fellowship were granted to the following successful candidates:

A. G. Tresidder, J. Penry, D. B. Cater, T. Denness, W. G. France, J. A. K. Johnson, C. M. Dransfield, M. A. Margo, J. W. M. Leslie, J. A. Rhind, W. D. Doey, K. H. Taylor, J. A. S. Green, C. A. Jackson, R. G. Robinson, D. F. Thompson, T. H. Cullen, J. S. McConnachie, K. W. Martin, A. J. Walker, F. H. D. Hutter, G. K. Rose, G. E. Stein, L. R. S. Taylor, C. E. Drew, H. H. G. Eastcott, A. Klidjian, P. C. Watson, T. L. Kennedy, H. W. A. Baron, A. Jolley, C. O. Fung-Kee-Fung, A. M. Wood, L. L. Bromley, I. A. Alexander, A. H. M. I. Ashoor, C. H. Bartlett, S. K. Burcher, M. Burdman, H. A. Daniels, J. B. Dow, H. B. Hattam, L. H. Hiranandani, E. S. R. Hughes, H. Ibrahim, D. S. Iyer, D. R. Leslie, J. Loewenthal, S. D. Loxton, A. B. McCarten, R. J. Manekshi, R. Marcus, K. W. Priddis, J. G. Pyper, R. F. Read, W. S. Rees, D. B. Robertson, D. R. Ryder, V. S. Sheth, F. N. Street, J. M. Tyler, S. A. Vincent, Muriel G. Waterfall, T. E. Wilson.

Diplomas in Anaesthetics were granted, jointly with the Royal College of Physicians of London, to the following successful candidates:

E. F. Adams, S. N. Albert, G. S. Ambardekar, J. D. M. Barton, W. L. Bilsland, R. P. Bliss, N. H. Bloom, R. A. Bowen, D. M. Brown, C. A. Cheatle, H. C. Churchill-Davidson, R. E. W. B. Comerford, R. L. Coulter, J. I. Davies, W. W. Deane, A. G. Doughty, G. L. Evans, H. Fairlie, D. J. H. Goodhew, Helen B. Gordon, R. W. G. Grindlay, J. R. Hamerton, G. Herington, M. H. W. Holloway, G. Houseman, M. S. Howe, J McN. Inglis, R. G. G. Jones, W. A. Jones, F. M. Lancaster, R. A. Lattey, J. D. Loughrey, T. H. McCall, I. M. McCully, A. I. MacKenzie, L. Mather, Julia M. Middleton, M. Nash, J. North, J. R. Odell, H. F. Patrick, A. W. Raffan, G. A. Rawlins, D. F. Rees, G. J. Rees, T. B. L. Roberts, Eleanor H. Russell, L. T. Scott, J. J. Slowe, J. Straton, E. I. Tate, W. N. Vellacott, G. L. Way, J. H. Willis, F. G. Wood-Smith, S. D. Young.

No. 49

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Dec. 7.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1946					1945 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	40	5	22	—	—	41	1	11	—	4
Deaths		—	—				1	—		
Diphtheria	313	31	91	33	7	574	43	181	76	24
Deaths	4	—	1		—	7	—	3	1	—
Dysentery	76	13	23	—	—	242	36	50	1	—
Deaths					—				—	—
Encephalitis lethargica, acute	1	—	—	—	—	1	1	—	—	—
Deaths		—					—			
Erysipelas			45	8	6			51	7	2
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				59					41	
Deaths	69	6	19		2	36	6	7	17	2
Measles*	6,466	239	225	44	179	611	33	103	188	1
Deaths	3	—	—		2	—	—	—	1	—
Ophthalmia neonatorum	60	4	9	—	—	54	4	8	—	—
Deaths										
Paratyphoid fever	6	2	—	1 (B)	—	—	—	—	—	—
Deaths	—	—	—		—	—	—	—	—	—
Pneumonia, influenzal	677	56	7	4	4	744	56	11	4	3
Deaths (from influenza)†	21	6	3		1	35	6	1	1	—
Pneumonia, primary			331	25				268	13	
Deaths		46			13		41		13	11
Polio-encephalitis, acute	1	—				5	—			
Deaths		—					—			
Poliomyelitis, acute	14	—	1	10	—	28	1	—	5	—
Deaths		—					—			
Puerperal fever		—	14		—		2	17		—
Deaths										
Puerperal pyrexia‡	128	9	8	1	—	116	16	12	1	1
Deaths		—					1			
Relapsing fever	—	—			—	1	—			—
Deaths										
Scarlet fever	1,277	109	360	37	39	1,779	144	280	26	55
Deaths	—	—	—		—	1	—	—	—	1
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths					—				—	—
Typhoid fever	7	2	—	4	2	5	1	1	1	—
Deaths	—	—	—		—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths					—				—	—
Whooping-cough*	1,783	105	247	87	33	1,225	102	65	25	10
Deaths	6	1	3		—	6	2	1	—	1
Deaths (0–1 year)	410	51	67		22	349	44	44	39	13
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,647	727	621		142	4,865	734	639	217	116
Annual death rate (per 1,000 persons living)			13·7					14·5	14·0	
Live births	9,620	1453	1158		271	6,630	890	853	351	244
Annual rate per 1,000 persons living			23·3					17·1	22·6	
Stillbirths	264	24	65			202	32	27		
Rate per 1,000 total births (including stillborn)			53					31		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

‡ Includes puerperal fever for England and Wales and Eire.

It is still not possible to publish the return of births and deaths for Eire for the weeks ended Oct. 26, Nov. 2, 9, 16, 23, 30, and Dec. 7.

EPIDEMIOLOGICAL NOTES

Neonatal Diarrhoea and Enteritis

Outbreaks of neonatal diarrhoea and enteritis have been reported from several widely separated institutions. Diarrhoea and enteritis is not notifiable, and how much the newly born have contributed to the recent rise in mortality cannot be determined until deaths by ages are available. Deaths from this cause in the 126 great towns increased during the 45th week of this year from 31 to 57, and small increases have been noted in subsequent weeks until 69 deaths were recorded in the 49th week. The number of deaths in recent weeks is above the total for the corresponding period of the preceding years, although the figures for earlier weeks had been considerably below the corresponding figures for previous years. A comparison of the deaths in the recent weeks with those of the same weeks in the two preceding years shows this trend:

Deaths from Diarrhoea and Enteritis in Infants under 2 years in the 126 great towns

Weeks	1946	1945	1944
35–39	201	363	386
40–44	198	269	239
45–49	317	177	200

In other words, the Registrar-General's figures for the first eleven weeks of the December quarter do not show any notable increase of mortality from enteritis and diarrhoea. In the 126 great towns, including London, the average number of deaths of infants under 2 years of age per 1,000 births for the December quarter 1946 to date was 5.8. The comparative figure for the same period of 1945 was 6.8.

Outbreaks recently reported from maternity homes and institutions in various parts of the country are not all of the same clinical type. The most serious appears to have been that at two hospitals in Leicestershire, with between 40 and 50 cases among infants and 23 deaths. In its high case mortality and relative lack of associated illness in adults this outbreak resembles incidents already recorded in America (Frant, S., and Abramson, H., *New York State J. Med.*, 1939, **39**, 784) and also in this country (Sakula, J., *Lancet*, 1943, **2**, 758). Clinically this condition usually begins during the first three weeks of life with a sudden weight loss which may precede obvious gastro-intestinal upset by several days. Pyrexia is not a marked feature, but the subsequent course suggests an intense toxaemia. In any particular institution the beginning of such an outbreak may not be explosive, there being intervals of a week or so between the first cases. Breast-feeding does not always protect, but the breast-fed infant usually appears to stand a better chance of survival. Pathological and bacteriological investigations have hitherto proved entirely negative. The only effective measure of control is closure of the ward or nursery concerned.

In the outbreak reported in connexion with a maternity home at Preston the illness of the 18 fatal cases started at varying intervals after discharge from the home, and the trouble began as long ago as August. It is not at present possible to state the case mortality of this outbreak, which presents some unusual clinical features that are being investigated by a team of paediatric specialists.

The illness among infants reported from institutions in several other areas differs clinically from that at Leicester and at Preston and appears to be much less severe. Usually mothers and nursing staff have been affected as well as infants. In one outbreak at Hull it is possible, though not yet confirmed, that the cause was a *Salmonella*.

Discussion of Table

In *England and Wales* increases were recorded in the notifications of measles 461, dysentery 18, and diphtheria 12, while decreases were reported for scarlet fever 106, whooping-cough 95, and acute pneumonia 68.

The fall in the incidence of scarlet fever was mainly contributed by the West Midland counties, but no county showed a large deviation from the total of the preceding week. The only change of any size in the local returns for diphtheria was an increase of 12 in Lancashire; the city of Liverpool accounts for half the notifications of diphtheria in this county and for one-eighth of the total for the whole country. The returns for whooping-cough rose slightly in the southern section of the country but fell in the north; the largest decline was Lancashire 56. The largest rises in the notification of measles were Glamorganshire 99, Middlesex 89, Lancashire 80, Northumberland 79, and Staffordshire 62; the only significant decline was Kent 99.

is healthy and there are no vitamin or hormone deficiencies there is no treatment indicated at present.

Absence of teeth is not infrequently hereditary. It is of interest in this particular case that the mother had no lower incisors. Unfortunately if the condition is hereditary there are no known precautions that can be taken to prevent a similar condition in the next child, though of course such absence may not necessarily be an inherited character with every child.

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Q.—*(1) Does cocaine sensitization exist or is it a myth? (2) Is it safe to use cocaine hydrochloride as a local anaesthetic injected into the tissues? (3) Is it safe to use a cocaine hydrochloride throat spray (say 10% as a preparation for laryngeal intubation) as a routine without first testing for susceptibility?*

A.—(1) Cocaine sensitization exists in the sense that some people require very much less cocaine to acquire a certain degree of anaesthesia than others; it exists also in the sense that in some persons toxic symptoms arise after very small doses. Severe toxic effects have occurred after a dose as small as 20 mg. (1/3 gr.).

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A.—A woman who has had an anencephalic child is more likely to produce another one than is the average woman. Nevertheless the absolute risk is not very great. The incidence of the condition rises as maternal age increases, but even should this patient be over forty the chance of the present baby being anencephalic is less than 1 in 20. It could be explained to her that the chances are heavily in favour of her child being perfectly formed. After all, the chances in any random pregnancy that the foetus will be malformed in one way or another are not so very different—say 1 in 50. In my opinion abortion on genetic grounds is quite unjustifiable. Anencephaly has been diagnosed radiologically at, of course, a relatively late stage. A radiologist might be consulted later as to whether examination was worth while; then, if the child did indeed prove to be anencephalic, the pregnancy might be terminated.

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Professional Use of Residence

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